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Old Series, Vol. XLVI

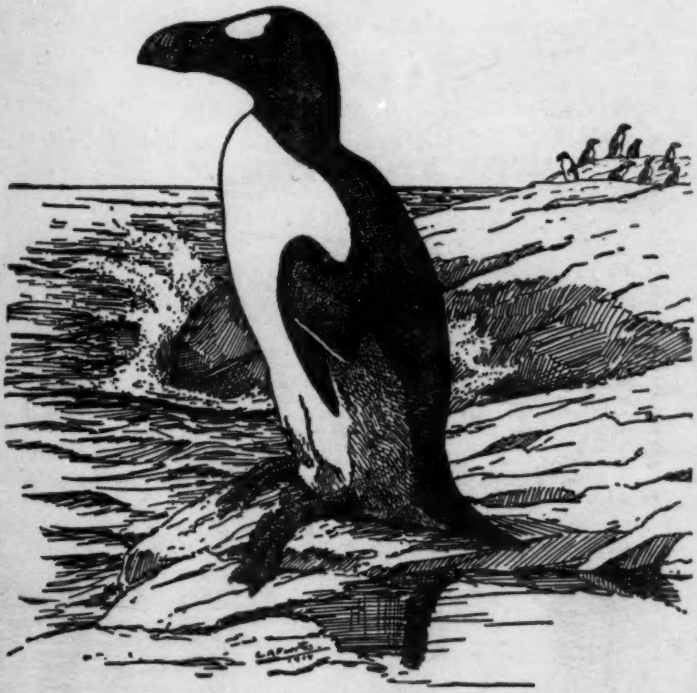
CONTINUATION OF THE BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New Series, Vol. XXXVIII

The Auk

A Quarterly Journal of Ornithology

Vol. XXXVIII APRIL, 1921 No. 2



PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

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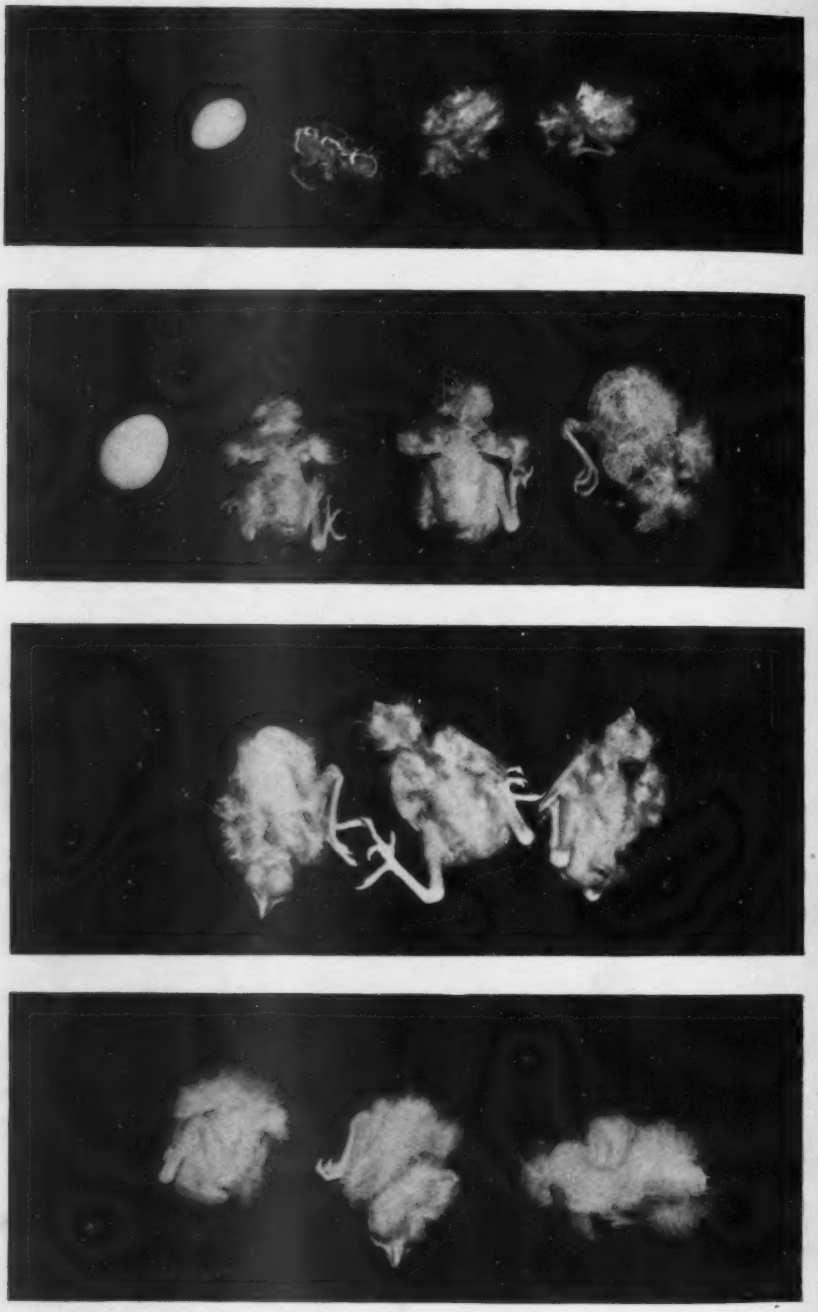


A BROOD OF YOUNG DICKCISSELS.

(*a*). Sterile Egg; One Young a Few Hours Old; Two Young One Day Old.
(*b*). One and Two Days Old.
(*c*). Three and Four Days Old.
(*d*). Another Brood Two Days Old with Natal Down at its Best.

THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XXXVIII. APRIL, 1921. No. 2

THE DICKCISSEL (SPIZA AMERICANA) OF THE ILLINOIS PRAIRIES.

BY ALFRED O. GROSS, PH.D.

Plates V–XIII.

(*Concluded from p. 26*)

VIII. FOOD.

THE following account of the food of the Dickcissel is based upon an examination of the contents of the stomachs and crops of birds collected near Atwood, Illinois, and upon observations made in the field during the nesting season. The author is indebted to Mr. E. R. Kalmbach of the U. S. Biological Survey and to Mr. A. N. Caudell of the U. S. Bureau of Entomology for the identification of the crop and stomach contents of 19 of the 33 birds obtained. The stomachs were taken from birds collected chiefly in August, a season of the year when insects and seeds form the most important part of the food of the Dickcissel.

The stomachs and crops contained vegetable matter to the amount of 68 per cent, the animal food constituting only 32 per cent of the entire contents. Examinations by the U. S. Biological Survey show that 44 of 250 stomachs collected during May to August, chiefly in Kansas but some from Minnesota, Wisconsin, and Texas, contained 70 per cent animal and only 30 per cent

vegetable matter, a ratio almost the reverse of that shown by my birds. The stomachs from Illinois, excepting four specimens, were taken from young birds of the year. This fact may be correlated with the larger amount of vegetable matter in the stomachs, as young inexperienced birds are not so adept as their parents in finding or in capturing insects. It is natural to expect such birds to depend on food which is more abundant and more easily obtained than live animal matter. Seeds, the chief and practically only vegetable matter eaten, were present everywhere in limitless quantities during August, the time at which the birds were collected.

About 53 per cent of the vegetable matter or 36 per cent of the entire contents of the stomachs was made up of seeds of weeds that are of no value to man, many of which, indeed, are a nuisance to agriculture.

There were nine species of weeds represented of which two species of *Chaetochloa glauca* and *C. viridis* made up 33 per cent of the entire contents of the stomachs. *Syntherisma sanginuale* was represented by 1.6 per cent, three species of *Polygonum* (*convolvulus, persicaria* and *aviculare*) 0.6 per cent, while seeds of *Stellaria media* and sedge grass were present in small numbers.

Unfortunately, for the good reputation of the Dickcissel, the grain amounted to 32 per cent of the entire contents; this quantity being divided between wheat (6.5 per cent) and oats (25.5 per cent). No grain was found in the stomachs of adult birds.

The animal matter consists of insects with traces of spiders and phalangids. The large number of Orthoptera found in the stomachs (28 per cent) and the fact that at least traces of grasshoppers were found in all stomachs except one maintain the reputation the Dickcissel holds as a destroyer of these insects. The Orthoptera found all belong to two families: the Acrididae, which comprised 26 per cent, and the Locustidae, which were present in the amount of only 2 per cent of the entire contents. Species of *Melanopus* were the commonest grasshoppers found in the stomachs. A cricket, *Nemobius fasciatus*, was taken from the beak of an adult bird.

The Lepidoptera, chiefly caterpillars, amounted to 3 per cent, the Coleoptera, though represented by traces of eight or more

species, were in amounts (0.2 per cent) too small to be of great importance. There were traces of two flies, two species of ants and an Ichneumon fly, all in small quantities.

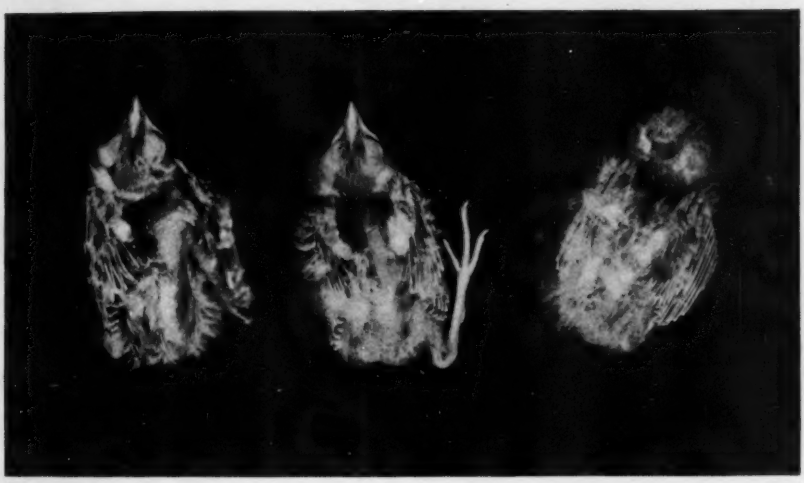
The results of the examination of the stomach contents are clearly in favor of the Dickcissel. It is true that 32 per cent of the food examined was grain, but this is counterbalanced by the 36 per cent of weed seeds. In addition, there stands in the credit column of the Dickcissel 32 per cent of insects, mostly the destructive grasshoppers. In regard to the grain, it is important to note that the stomachs were taken at a time when the oats and wheat had been removed from the fields for threshing. It is probable the grain eaten represents a waste product. But more might have been eaten if examination had been made before harvesting. The small amount of grain which I have seen Dickcissels eat in the field before harvest time was taken from heads or panicles which were lying on the ground, a product which cannot be gathered by the binder and therefore is classed as waste.

The results obtained from the examination of the stomach contents give us much that is interesting regarding the food of the Dickcissel, but they are not all the evidence in the case of the Dickcissel versus man. The daily observations made at the nests when the young were being fed deserve an equal amount of consideration. It is not until we consider the feeding habits during the nesting season that the Dickcissel receives the full credit it deserves as a destroyer of insects, especially grasshoppers.

The first food delivered to the newly hatched Dickcissels were small green Lepidopterous larvae; sometimes soft-bodied, winged insects were the first bits of food to be received by the young. Though scores of these larvae and insects were delivered by the adult birds there were very few present in the stomach contents of the adult birds examined. One female made regular trips every few minutes to an elm tree from which she was obtaining bright green caterpillars two to three centimeters in length the species of which I was unable to determine. It is probable that these caterpillars constituted as much as 90 per cent of the food of the young birds during the first two days of their existence. When under observation the female made an average of ten trips an hour which means, if this average was maintained, that these

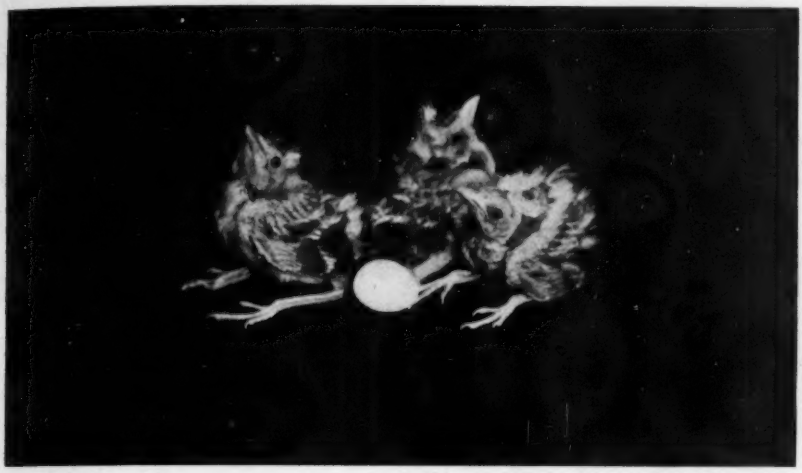
nestlings were indirectly responsible for the destruction of more than one hundred larvae during a single day. On the third and fourth days other insects were added to the diet of the young. There were a number of aphids, a few winged insects which could not be identified, and a considerable number of small grasshopper nymphs. With this addition of other insects there was, of course a correspondingly smaller number of caterpillars eaten.

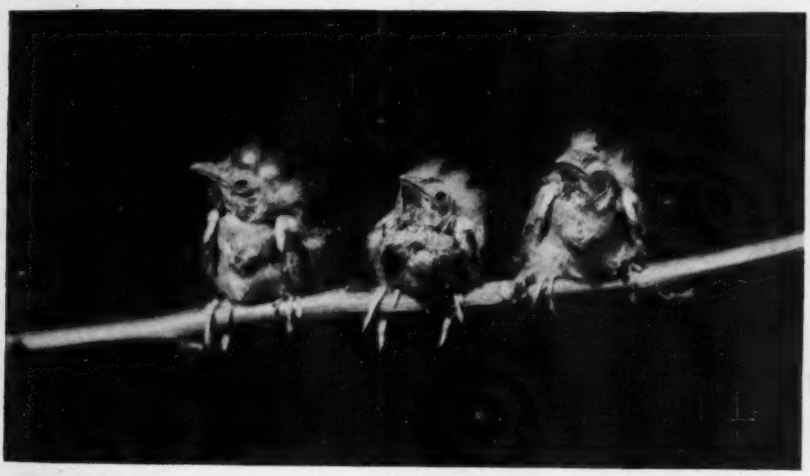
From the fifth day until the young left the nest four days later, the food was practically all grasshopper nymphs and adults. These grasshoppers were taken from a nearby clover field which was being overrun by them. Many of the clover stems were, stripped of their leaves by the ravages of these insects. During the last days spent by the young in the nest, grasshoppers were delivered at the rate of one every three or four minutes. A conservative estimate shows that about two hundred grasshoppers were eaten each day by the two adult birds and their four young. If each Dickcissel family in Illinois averaged as well as did these birds, then the more than a million Dickcissels destroyed about 100,000,000 grasshoppers in a single day during this period of the nesting season. If each grasshopper according to an estimate made by Professor Lawrence Bruner, entomologist of the Nebraska Experiment Station, eats about one and a half times its own weight or about .05 ounces of grass per day, then a hundred million grasshoppers destroy about 156 tons. The price of hay during the summer of 1918 was about thirty dollars per ton. Hence the Dickcissels of Illinois during the active period of the nesting season save the state about $4,680.00 daily by the destruction of grasshoppers alone. These figures have a meaning which no one can fail to understand. Though the great value of these birds may not be fully known to the average farmer, the Dickcissel, nevertheless, is a favorite with many of them. No farmer wantonly destroys these birds nor does he willingly permit anyone else to do so. With such a strong popular sentiment already in their favor the Dickcissels are destined to continue their great increase in numbers.



A BROOD OF YOUNG DICKCISSELS.

(*a*). Sterile Egg; Young Four and Five Days Old.
(*b*). Six and Seven Days Old.
(*c*). Six Days Old.





A BROOD OF YOUNG DICKCISSELS.

(*a*). Seven and Eight Days Old.
(*b*). Eight and Nine Days Old.
(*c*). Ten Days Old.

IX. LIFE HISTORY.

A.—The Nest.

In Central Illinois the first nests of the Dickcissel may be found during the last week of May, soon after the bulk of the individuals have arrived at their summer haunts. The author's earliest record is of a nest found May 22, 1899, in a meadow of clover and timothy near Atwood, Illinois. The earliest nest reported by Mr. I. E. Hess at Philo, Illinois, is one with five eggs, found May 31, 1896. Mr. T. E. Musselman, of Quincy, Illinois, found a nest and four eggs near a putting green on the Quincy Golf links as early as May 21, 1918. Though nests are not uncommon in May, the Dickcissel does not reach the height of its nesting season until June and July. At this time practically every meadow in central Illinois has several pairs of these interesting birds. The latest record reported by Mr. Hess is that of a nest with four eggs found August 1, 1898, near Philo. On August 12, 1918, the author found a nest with four eggs in a clover field near Atwood; this is the latest record I have of a nest containing eggs. (Plate I, Fig. *b*.)

The usual and most typical location for the nest of the Dickcissel in Central Illinois is in a thick growth of grass or other low dense vegetation. The nest, if not placed where there is a natural depression of the earth, is supported but a few inches above the ground. It is usually so well hidden by the rank growth of clover, grass or weeds that great effort is often required to locate it. Meadows provide the larger number of nesting sites, but the Dickcissel is by no means confined to them, for it sometimes selects a very different place which may be remote from clover and grass fields. The following list of situations containing nests of the Dickcissel, which came under my direct observation, reveals the diversity in choice which may be exhibited by different individuals.

As the table shows the largest number of nests were found in the meadows or in places containing vegetation approaching that present in the clover or grass fields. About an eighth of the nests observed were in situations radically different from that ordinarily found in the meadows. Of these ten nests, all except

two were found late in the season and probably represented a second attempt at nesting, after the mowers and reapers had exacted their toll of nests from the meadows and grain fields. One of the nests found in a thorn bush early in the season was undoubtedly so placed because of the wet, swampy condition of the ground at that time of year. The nests located in shrubs and trees were at various heights ranging from about two feet to a little more than six feet from the ground, the highest having been found in a tall hedge. Though nests are sometimes placed at considerable distances from the ground, these do not represent a typical or usual situation for the Dickcissel.

TABLE XI.

LOCATIONS OF DICKCISSEL NESTS.

Classification of situations	number of nests (containing eggs or young) found	
A. Meadows or situations resembling meadows.		
1. Meadows		
Clover	28	
Timothy and other grasses	17	
Alfalfa	5	
2. Weeds and grass along fences or between cultivated fields	8	
3. Wheat and clover	2	
4. Weeds and grass along roadsides	2	
5. Wild roses or vines growing among grass and weeds	6	
Total		68
B. Situations radically different from conditions found in meadows.		
1. Hedge fences (osage orange)	5	
2. Scrub apple tree	2	
3. Thorn bush	2	
4. Small crabapple tree	1	
Total		10
Grand Total		78

The nests are somewhat crude in general appearance, but, nevertheless, are substantial structures (Plates I and IV). There is little variation in size or shape, the average measurements of ten typical nests being as follows—outside diameter 12.2 cm., inside diameter 6 cm. by 6.8 cm., outside depth 6.3 cm., inside depth 4.6 cm. The materials used seem to be those which are near at hand and, as a consequence, the composition varies according to the building material available in the immediate surroundings. Though the nests are firm and well made, those built above ground are often so insecurely attached to their support that the least disturbance may dislodge them. Two nests which were under daily observation had to be firmly tied to the vines in which they were built in order to prevent an untimely ending of the young birds.

One nest was found in the process of construction. In this case the female gathered all of the materials and performed all the work of constructing and shaping the nest. All that the male contributed was his song, which perhaps served as a source of encouragement to his mate. The nest was completed in four days and two days later the first egg was laid.

B.—The Eggs.

The eggs of the Dickcissel are pale blue, similar to those of the Bluebird (*Sialia s. sialis* (Linn.)). The average measurements and weight of twenty eggs are as follows:

Average long diameter	2.13 cm.
Average short diameter	1.61 cm.
Average weight	2.76 grams.

The number of eggs in a set varies from three to five, but four is the usual number. Out of twenty-nine nests containing eggs, five had three eggs, eighteen had four and six had five eggs each. Three of the five nests containing only three eggs were under daily observation and no more eggs were added but one or more eggs may have been destroyed before observations were begun.

A large number of sterile eggs were found during the course of these studies. Six out of eleven nests, studied during the summer of 1918, contained one or more sterile eggs. In each of four of

the six nests there was one sterile egg, in another there were two and in the sixth only one egg out of the five proved to be fertile. It was thought possible that the eggs had been chilled or that the embryo had been otherwise killed, but an examination of the contents of the unhatched eggs proved that development had never been initiated or at least had not proceeded to an appreciable degree.

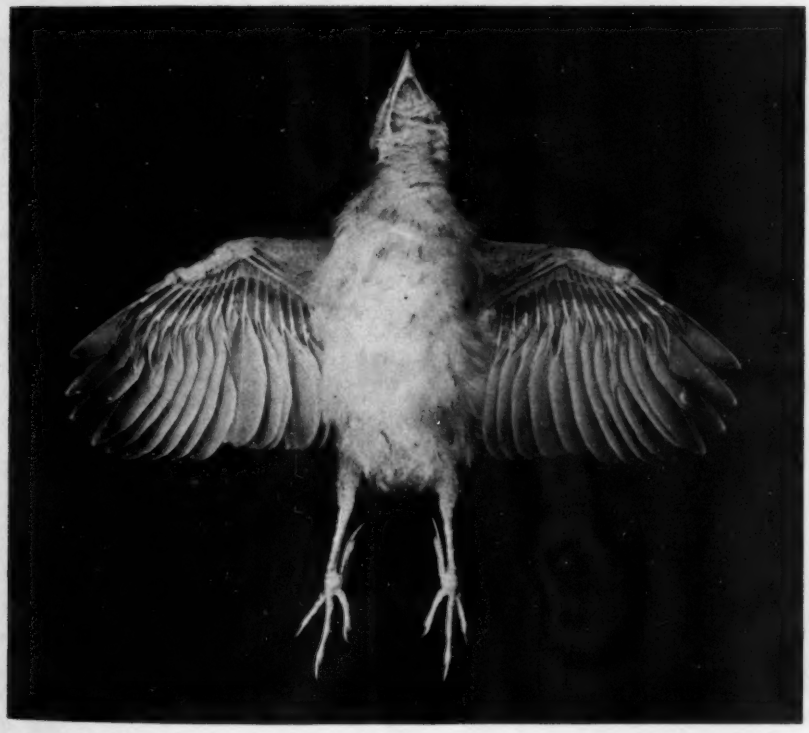
Unfortunately, the exact time required for incubation was not ascertained, since the only nests in which the dates of the laying of the eggs were known were destroyed by some animal, presumably a skunk. One of the eggs of a nest containing three apparently freshly laid eggs which was first seen July 1, hatched during the morning of July 11. Consequently, at least ten to eleven days, and possibly more, are required for incubation. When the embryo is fully developed and ready to emerge the egg shell and membranes break around the entire circumference midway between the blunt and more pointed ends. The break seems to be made by the exertions of the struggling embryo to straighten its neck and to extend its legs in an effort to free itself. After the egg is cracked (Plate IV, fig. a), it is a matter of only a few minutes before the young entirely frees itself. A freshly hatched Dickcissel is anything but a handsome creature (Plate V, fig. a). At this time it is naked except for the patches of natal down, which, when wet and matted, are practically negligible as a covering.

C.—Natal Plumage.

The natal plumage, or down, of the Dickcissel when dry is pure white, there being no traces of the brown or gray tinges so commonly seen in the down of other passerine birds.

There are twelve distinct tracts or areas of down found on the upper surface of the bird as follows,—three small areas located on the dorsal-posterior part of the head, 1 median, 2 lateral, which collectively may be known as a head tract; one tract on each scapular region; two smaller tracts on the dorsal side of each wing; one elongated tract in the mid-dorsal line and one shorter tract on each side running parallel to the mid-dorsal tract. There is no down on the ventral aspect of the body, the entire underparts being naked until the juvenal plumage appears.

YOUNG DICKCISSEL FROM SAME BROOD.
(*a*) and (*b*). Eleven Days Old.
(*c*). Twelve Days Old.



YOUNG DICKCISSEL FROM SAME BROOD.
Fourteen Days Old. (Six Days after Leaving the Nest.) Juvenal Plumage.

The natal down is retained throughout the period the young remain in the nest; sometimes parts of it persist after the young have left the nest for several days, as filaments at the apices of the feathers of the juvenal plumage. The postnatal moult is usually completed at about the ninth to the twelfth day after hatching, or one to three days after the young leave the nest. (Plate VII, fig. c.)

D.—Juvenal Plumage

The first feather papillae of the juvenal plumage to appear are those of the primaries and secondaries (alar or wing tract), which protrude through the epidermis of the wing on the second day after hatching (Plate V, fig. c). All the other tracts both dorsal and ventral are well defined by protruding papillae at the end of the fourth day (Plate VI, fig. a). Those of the head tract and caudal or tail tract are the last to appear.

The growth of the feather papillae is extremely rapid and by the end of the sixth day those of the alar tract begin to unsheath at the outer tips (Plate VI, figs. b and c.). The unsheathing of the feathers now progresses very rapidly and by the end of the tenth day the exposed tips of nearly all the contour feathers are unsheathed (Plate VII, fig. c.). The time of appearance and the rate of growth of the feathers of the various tracts are shown in Table XII.

The table of measurements is one of a series of tables made for each of eighteen fledgelings representing five different broods. This table was selected because it is typical of the series and is more complete than the others for the period following the time after the young had left the nest. The fledgeling from which the measurements were taken left the nest eight days after hatching, but was found on each of the six succeeding days, thus enabling me to make, as far as I know, the most complete series of measurements on record of a wild passerine bird living in nature under normal conditions. This Dickcissel, having been seen and handled so many times, became an intimate friend, and it was a cause of no little regret to the author that it failed to appear after the measurements and pictures were taken on August 1, 1918. The measurements of a bird eighteen days old, also given in the

TABLE XII.

WEIGHTS IN GRAMS AND MEASUREMENTS IN CENTIMETERS OF DICKCISSEL NESTLING No. 1 FROM THE DAY IT HATCHED UNTIL IT WAS FOURTEEN DAYS OLD. THIS BIRD IS SHOWN IN THE REPRODUCTIONS GIVEN IN PLATES V TO IX INCLUSIVE. THE BIRD EIGHTEEN DAYS OLD (PLATE X) IS FROM ANOTHER BROOD.

	Time spent in the nest								Out of the nest						
Days old	1	2	3	4	5	6	7	8	9	10	11	12	13	14	18
Bill	.38	.65	.80	.85	.90	.93	.98	1.0	1.04	1.12	1.12	1.14	1.15	1.15	1.25
Wing	.8	1.2	1.6	2.3	3.0	3.6	3.7	4.2	4.4	4.7	4.9	5.2	5.8	6.0	6.7
Length	3.8	4.6	5.3	6.2	6.7	7.3	7.5	7.6	8.0	8.4	8.9	9.2	10.0	10.5	13.3
Tail	–	–	–	.01	.06	.25	.35	.40	.45	.50	.60	.95	1.3	1.5	3.8
Extent	3.4	4.9	6.1	9.5	11.6	14.4	16.1	17.0	17.4	18.5	19.6	20.4	21.0	21.8	22.8
Tarsus with middle toe	1.6	2.0	2.7	3.5	3.8	4.0	4.2	4.4	4.5	4.5	4.5	4.5	4.6	4.6	4.6
3rd or front middle toenail	.15	.20	.29	.30	.40	.42	.43	.44	.46	.48	.50	.50	.50	.50	.52
1st or hind toenail	.19	.28	.35	.48	.50	.52	.55	.56	.59	.62	.65	.68	.68	.68	.70
6th Primary	–	–	.2	.29	1.5	2.2	2.4	2.5	2.7	3.0	3.5	3.7	4.2	4.4	4.8
2nd Secondary	–	–	.3	.8	1.3	1.8	2.2	2.3	2.3	2.7	3.0	3.3	3.7	3.8	4.4
Papillae or feathers of ventral tract	–	–	–	.24	.32	.40	.55	.76	.95	1.00	1.12	1.22	1.25	1.25	1.50
Of dorsal tract	–	–	–	.20	.34	.48	.70	1.18	1.39	1.48	1.52	1.57	1.60	1.65	1.70
Of head tract	–	–	–	.05	.09	.12	.28	.55	.60	.60	.61	.61	.62	.63	.68
Weight in grams	2.8	4.7	7.2	10.3	11.7	13.0	15.7	18.0	18.5	18.8	19.1	20.3	21.9	22.5	26.6

above table were made from a marked young of another brood in which the complete history was known up to the ninth day, the time it left the nest. The measurements of this eighteen-day-old bird up to the ninth day are similar in all essentials to those shown in Plates V–IX made at the corresponding ages.

Table XIII, compiled from the measurements given in Table XII, is helpful in comparing the average growth per day of the young made during different periods of time.

TABLE XIII.

AVERAGE GROWTH PER DAY OF YOUNG DICKCISSEL IN CENTIMETERS AND GRAMS.

	Average growth per day for 1st 8 days (In nest).	Average growth per day from 8th to 18th day (out of nest).	Average growth per day for 18 days.
Bill	.077 cm.	.025 cm.	.048 cm.
Wing	.425	.250	.328
Length	.475	.570	.528
Tail	.078	.335	.247
Extent	1.700	.580	1.080
Tarsus with middle toe	.350	.010	.167
Third or front middle toe-nail	.035	.008	.020
First or hind middle toe-nail	.046	.011	.028
Sixth primary	.383	.230	.290
Second secondary	.333	.110	.259
Papillae or feathers of the ventral tract	.104	.055	.084
Papillae or feathers of the dorsal tract	.196	.031	.100
Papillae or feathers of the head tract	.100	.013	.042
Weight	1.900 gms.	.810 gms.	1.322 gms.

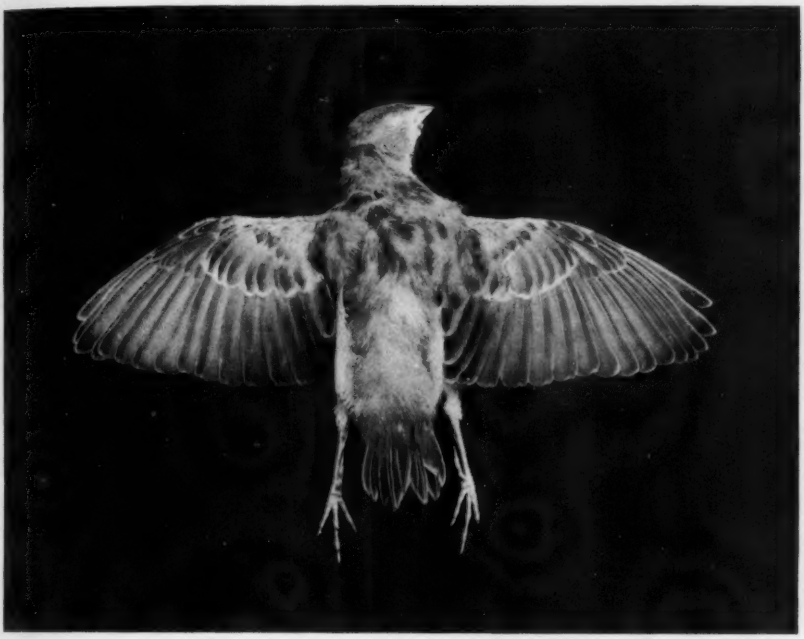
An examination of the above table at once reveals the fact that the growth of such parts as the tarsus and nails is practically completed by the time the young leave the nest: whereas, the tail, which is more than fifteen centimeters long in the adult, is less than one half of a centimeter in length at this time. The period required for development is closely correlated with the time at

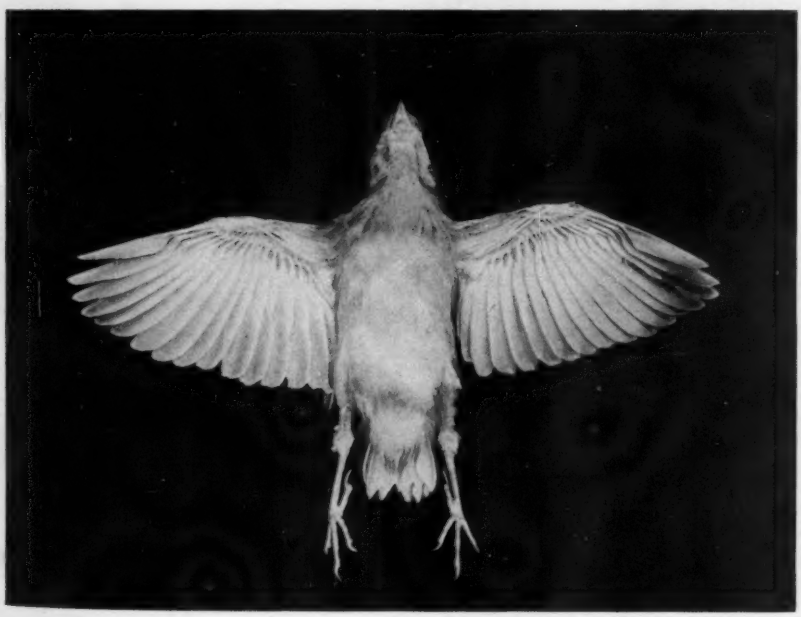
which the bird acquires the use of the respective parts. The legs and toes are called upon to serve the bird the moment it leaps from the nest, whereas a long tail would be a nuisance in the crowded nest and is not at all essential until flight is attempted. The relations of growth to the age of the bird are well shown in the accompaning curves representing growth of parts of young Dickcissel, plotted from data contained in Table XII. The numbers on the abscissa represent days and those on the ordinate indicate the units of growth in centimeters. The curves represent the growth made by the following parts respectively: 1. bill; 2. tail; 3. second secondary; 4. tarsus with toe; 5. wing; 6. length and 7. extent. It will be noticed that in nearly all cases growth was slightly retarded, represented by a dip in the curve, at the eighth day, the time this bird left the nest.

The weight of the young Dickcissel while in the nest increases at the rate of almost two grams per day, but it is less than half that amount for the few days after it leaves the nest. In one extreme case the bird lost in weight; evidently it either received less food or else expended it in energy, probably the latter.

The young of the Dickcissel leaves the nest on the eighth to the tenth day after hatching. From five nests under daily observation two of the broods left at the end of eight and nine days respectively (one or more eggs hatching a day later than the others); two broods left on the ninth day; and of a fifth brood of four young, three disappeared on the eighth day, and one remained in the nest until ten days old.

Each of the eighteen Dickcissel nestlings of the five broods noted above was tagged with a number in the hope that it might be again captured for further study during the same season or in some subsequent year. Many of the birds were seen from one to six days after they left the nest, thus making it possible to obtain complete and consecutive measurements, descriptions and photographs of the young for nearly a week after they had left the nest. The young, though often at a considerable distance from the nest, were easily located by watching the feeding operations of the mother. It became increasingly difficult, however, to find them as they acquired the ability to fly or to run quickly through the grass and weeds. A tagged bird eighteen

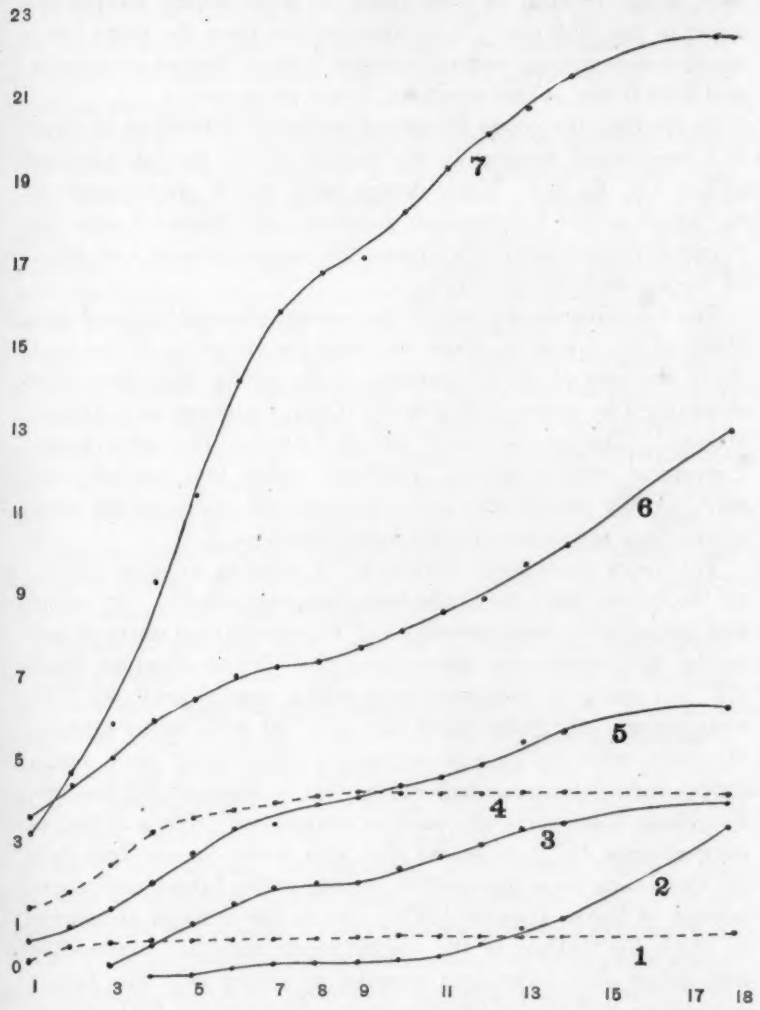




A YOUNG DICKCISSEL.

Eighteen Days Old. (Ten Days after Leaving the Nest.) Juvenal Plumage.

days old (Plate X, figs. a. and b.) was collected in a field a mile away from its home, an incident which helps explain the difficulty in securing the older stages of the young tagged birds. An attempt



was made to study one brood by tying one end of a string to the leg of the nestling and the other to the base of a weed stalk. The

female continued to feed the young as if they were free. That they grew and flourished is evidenced by the daily increase in weights and measurements. All three birds of this brood, however, either escaped or were taken by some animal during the night of the fifth day. Since this method gave the birds but a small chance against natural enemies, such as the cat and skunk, and since it was at best abnormal, it was not repeated.

At the time the young Dickcissel leaves the nest the natal down is a conspicious element in the contour of the juvenal plumage (Plate VII, fig. b.). These downy tufts, which are attached to the apices of the feathers, are, however, soon worn off after the young begins an active life among the tangled grasses and weeds of the meadow (Plate VII, fig. c.).

The following description of the juvenal plumage is based on a study of the young at about the time the latter leave the nest. As in the case of the descriptions of the adults, the colors were determined by means of Ridgway's 'Color Standards and Nomenclature.' The numbers and letters following the color names correspond respectively to Ridgway's color, hue number, and tone. While considerable care was exercised in comparing these colors, they are at best merely approximations.

The upper parts buffy brown (17‴i) shading to sepia (17″m) on the crown; feathers of the back fuscous-black (13⁗m) edged and tipped with cinnamon-buff (17″b); unsheathed parts of primaries and secondaries mouse gray (15⁗k) to chaetura black (17⁗m) narrowly margined with pallid neutral gray (67⁗f); wing coverts olivaceous black (3) (23⁗m) with broad margins of cream color (19′f); edge of wings, superciliary and malar stripes light ochraceous-buff (15′b), but in some of the younger fledgelings these parts approach an orange-buff (15d) and even a deep chrome (17b) in color; chin and lower breast light buff (17′f) shading to a lighter tint on the belly; breast and upper portion of flanks chamois (19″b), but in the younger specimens in which the feathers of the ventral tracts have just unsheathed and before they have been exposed to strong light the breast approaches buff-yellow (19d) in color. None of the birds of this age have black streaks in the feathers of the breast; the beak and legs are pale flesh color (7′f), but these parts become darker as

the bird grows older. Although the young Dickcissel is unable to fly at the time it leaves the nest, it acquires the ability very quickly and within two or three days, when the bird is about 11 days old (Plate VIII, figs. a. and b.), it is able to go from 100 to 150 feet in a single flight. This distance was sometimes exceeded in test flights when the bird was given the advantage of a start from an elevated perch.

The Dickcissel undergoes several changes by the fourteenth day. The natal down is entirely lost in all individuals of this age, and even earlier if the birds are allowed to live a normal life in the grass fields. The general coloration of this stage of the juvenal plumage is similar to that of the bird eight or nine days old, but is duller in tone. There is none of the rich ochraceous-buff which is so conspicious in the recently unsheathed feathers. This change in color is not brought about by a moult, but apparently is due to a chemical change caused by either light or exposure to air or both. The unsheathing of the feathers in a Dickcissel 14 days old is so far advanced that from a casual examination of the contour it seems complete. Many of the feathers, however, such as the primaries and secondaries of the alar tract, still retain a portion of their sheaths (Plate IX, fig. b.). This unsheathing proceeds slowly; even in a bird 18 days old, the outer primaries are not completely freed of their envelopes (Plate X, fig. b.).

The dorsal plumage of an eighteen day old Dickcissel (Plate X, fig. a) is very similar in coloration to that found in the bird fourteen days old described above. The ventral aspect of the older bird, however, differs from the younger as follows,—bordering the sides of the throat in the older bird are two well defined fuscous malar stripes, which extend posteriorly towards the breast. The sides of the chamois colored breast are distinctly streaked with fuscous. In the center of the breast, many of the feathers have narrow but distinct median fuscous stripes, all of which, at the age of eighteen days, are completely concealed from view by the overlapping tips of the feathers. A close examination of the breast region reveals other similiarly marked feathers in various stages of development. These new feathers are representatives of the first winter plumage and are destined to replace those of the juvenal phase. The feathers of the breast of the birds in

the first winter plumage differ from those of birds in the juvenal stage not only in color but also in having a coarser texture. The transition from the juvenal to the first winter plumage is not so sharply defined, however, as the change from the nuptial to the adult winter plumage, which involves a complete post-nuptial moult. In the former there is only a partial post-juvenal moult, which occurs so gradually that it is difficult to say at what age the juvenal plumage ends and the first winter plumage begins.

Birds in the transitional states between the juvenal and first winter plumages were collected during the last week of June and the first week of August; representatives of the first and second broods, respectively.

A study of specimens, collected during various times of the summer, leads me to believe that the transition from the juvenal to the first winter plumage is a more prolonged process in birds of the first brood than it is in those reared late in the season. No young birds were found in the completed first winter plumage before the last week of July. At this time, though it was possible to obtain a graded series of birds from the juvenal to the first winter plumage, there was a predominance of two types of young: those with the completed first winter plumage and those still in the juvenal stage having few or no feathers of the winter plumage fully developed. This condition substantiates the statements that two broods are reared during each nesting season.

The post-juvenal moult, which includes all but the primaries, secondaries and rectrices, is well advanced in young birds five to eight weeks old, but not nearly all the feathers of the first winter plumage are fully developed by this time.

The following description is based on 5 birds (Plate XI, fig. a) ranging from 5 to about 8 weeks old. (The names of the colors used in the description were determined like the preceding with the aid of Ridgway's standards).

Males and females are similar in coloration. Crown, back and sides of the neck and rump buffy brown (17‴i) or olive-brown (17‴k); crown streaked with fuscous-black (13⁗m); back snuff brown (15″k) and light clay color (17″a), the feathers with large-conspicuous streaks of black. Primaries, secondaries and tail feathers as described in the juvenal plumage. Greater and lesser

wing coverts and tertiaries fuscous-black (13''''m) broadly margined with sayal brown (15''i), but in some specimens the coverts are edged with tawny (13'i); edge of the wing and line over the eye yellow ocher (17'a); auriculars, breast and flanks buffy brown (17'''i); breast and flanks streaked with black; throat and chin cartridge buff (19''f) margined by malar streaks or stripes of black; broad short maize yellow (19f) bands lateral to the black malar stripes; lower breast and belly light cream color (19'f); unstreaked crissum or under tail coverts light buff (17'f).

In young birds estimated to be more than eight weeks old, (Plate XI, fig. b), in which the first winter plumage is practically complete the following changes are to be noted. The yellow of the bend of the wing, malar and superciliary stripes more extensive and approaches a buff-yellow (19d) tint; throat warm buff (17'd); breast empire yellow (21b) or light orange-yellow. In some specimens a yellow wash extends down to the region of the belly. In one female and one male bird there was a small obscured patch of chestnut brown which sharply divided the buff of the throat and the yellow of the breast (specimens 62 and 77, Plate XI, fig. b). The lesser and greater wing coverts vary from cinnamon-rufous (11'i); to bay (7m). The streaks of the breast not as conspicuous as in younger birds. In all other respects the older birds of the first winter plumage are similar to those five to eight weeks old.

Some of the young are partially dependent on the adults for food up to the time they have attained the full first winter plumage. I have often seen females at the roosts feeding young in the most advanced stages of the winter plumage. In this way the family groups retain their identity even after the birds are congregated in immense flocks preceding their migration to the south.

ADDITIONAL DATA

RELATIVE TO BIRDS SHOWN IN THE PLATES.

Of the two nests shown in Plate I, the upper one was located in a timothy field and was made up entirely of dried grass stems; the stems on the outside were coarser than those comprising the lining. The base of the nest rested upon leaves and dried grasses, which formed the natural covering of the ground. The dew-berry vine growing up over the nest

afforded excellent protection from the hot rays of the sun and from the violent rain storms. These vines are very abundant in the fields of southern Illinois, where they are often utilized by birds not only for nesting sites but also for food. In the vines a few yards distant from this nest were two nests of the Field Sparrow containing young. The other nest was in a second growth clover field and constituted the latest record I have of a nest containing eggs (August 12, 1918). It was made of corn husks and rootlets, remnants from the corn grown in the same field during the preceding year. The upper nest shown in Plate III, was located among the weeds of fallow ground and was made chiefly of roots with a few coarse grasses on the upper rim. This nest was supported about eight inches above the ground by tall weed stalks. The second nest was built about five feet above ground in a thick cluster of wild grape vines which were clinging to a number of small trees. It was composed of stems of weeds and grass, corn husks, grape bark and leaves, all of which were materials present in abundance on the ground near the nest. The Dickcissel utilizes whatever is close at hand and seldom, if ever, goes any great distance for its nesting materials.

This nest later became so badly infested with mites that the young were almost killed by them. The same mites, though less abundant, were found in a large number of nests. The mite according to Nathan Banks of the Museum of Comparative Zoology is probably a new species of *Liponysus* allied to the common poultry mite.

Plate IV, figure a shows a nest and four eggs of the Dickcissel found July 15, 1918, in the tall weeds and grass along a public road near Atwood, Douglas County, Illinois. The picture as here reproduced shows the nest as it appeared on July 17, when one of the embryos was in the act of breaking the shell. This Dickcissel home furnished many of the notes used in the discussion of behavior in the sixth chapter of this paper.

The nest was made of clover and stems of weeds, corn husks, and leaves. It was lined and covered with straw and dried grass. The interior measurements of the nest were 6 cm. x 6.5 cm. in diameter and 4.5 cm. deep. The measurements and weights of the eggs were as follows:

No.	Long diameter	Short diameter	Weight
1	2.12 cm.	1.66 cm.	2.84 grams
2	2.14 cm.	1.64 cm.	2.98 grams
3	2.08 cm.	1.65 cm.	2.85 grams
4	2.20 cm.	1.65 cm.	2.66 grams

Egg no. 4 was sterile.

The nest shown in Plate IV, fig. b when found on July 21, 1918, contained one young, one embryo just emerging, and two eggs. One of the eggs hatched on the following day, but the fourth was sterile. Two of the birds shown in the nest are four days old and the other three days old.

Plate V figure a, shows the young birds and a sterile egg from the same nest photographed July 18, 1918. The young are arranged in the order in which they were hatched. The young on the extreme right the first to hatch, is the one shown in Plate IV fig. a, in the act of emerging from the shell. The first bird at its left was hatched a few hours later, and the one on the extreme left next to the egg, was hatched on the following day about ten minutes before the photograph was taken. This bird weighed 2.8 grams before it had received any food from the mother. Its weights and measurements on this and successive days are given in Table XII. The same three young are shown in the other figures on Plates V and VI and are arranged in the same order, the oldest bird always on the right, the youngest on the left of the group. The sterile egg is included in many of the figures to serve as a means of comparing the relative sizes of the young. In preparation for photographing them, the young were removed from the nest and placed on a background of black cloth in order to show the parts to better advantage.

In Plate V figure b, taken July 19, 1918, the bird to the right is two days old, and has the first feather papillae of the juvenal plumage broken through the epidermis in the region of the alar tract. Figure d, represents birds two days old, taken from another series, to show the natal down at its best and also the protruding feather papillae of the primaries in the alar tract.

Figure c, shows the original brood at the age of three and four days. Photograph taken July 31, 1918. At this age the young exhibit considerable activity when removed from the nest, the legs are in almost constant motion. The eyes of these birds four days old, are already open, but they are closed when the birds are brought into strong light. The feather papillae are present in all the main feather tracts, those of the wings are considerably lengthened. For measurements, see table XII.

Plate VI, illustrates the same birds, the two at the right in figure a, being five days old, the other four and all feather tracts well defined by projecting papillae. Photograph taken July 22, 1919.

In figure b, the birds are respectively six and seven days old. Photographed July 24, 1918. The feather papillae have now undergone great development and some of them are beginning to unsheath at the tips. The natal down is becoming less important as a covering. Note the great development of the tarsus and toes, well shown in nestling No. 2, in the middle of the group. See table XII for measurements of nestling No. 1, on the left. All nestlings at this age were banded in addition to the marks made by clipping the tips of certain toe nails to aid in identifying the birds after they left the nest. In figure c the six days old bird is placed on its back to show the relative development of the feathers of the ventral tract at this age. The tips of most of the feathers are unsheathed. Persisting tufts of natal down in the head tract are well shown here.

In Plate VII figure a, taken July 25, 1918, the young Dickcissels are seven and eight days old. In this picture the younger bird is on the right.

The egg shown here is the same one shown in earlier photographs. It was left in the nest until after the latter had been abandoned by the young which occurred on July 26. The young seem to have the instinct of fear suddenly developed at this age. This fear seems to be greatly increased when they hear the warning notes of the adults. Observe the awkward legs, which are almost as long as those of the adult.

Figure b, shows the birds eight and nine days old, and was taken July 26, 1919, the last day that they spent in the nest. Birds of this age are unable to fly but they make good use of their legs, which are now fully developed. The feathers of all parts of the body have progressed in the process of unsheathing to such an extent that they now form an effective covering and protection. For a complete description of the plumage of the Dickcissels of this age see text page 176 and for measurements consult table XII, page 172. In figure c, a young Dickcissel ten days old is shown. Notice how the natal down has been worn away by a day among the weeds and grass. These birds were easily found by watching the feeding operations of the female, while the tags and nail marks identified them.

Plate VIII figures a and b, show a bird eleven days of age. This individual was able to fly 100 to 150 feet in a single flight, and when placed on a perch as shown in figures it often exceeded this distance. For a description of this stage of the juvenal plumage see text page 177. In figure c, the bird is twelve days old, and the feathers of the ventral tract are entirely unsheathed. Birds twelve days old are very active and it required no little patience and care to secure pictures of them.

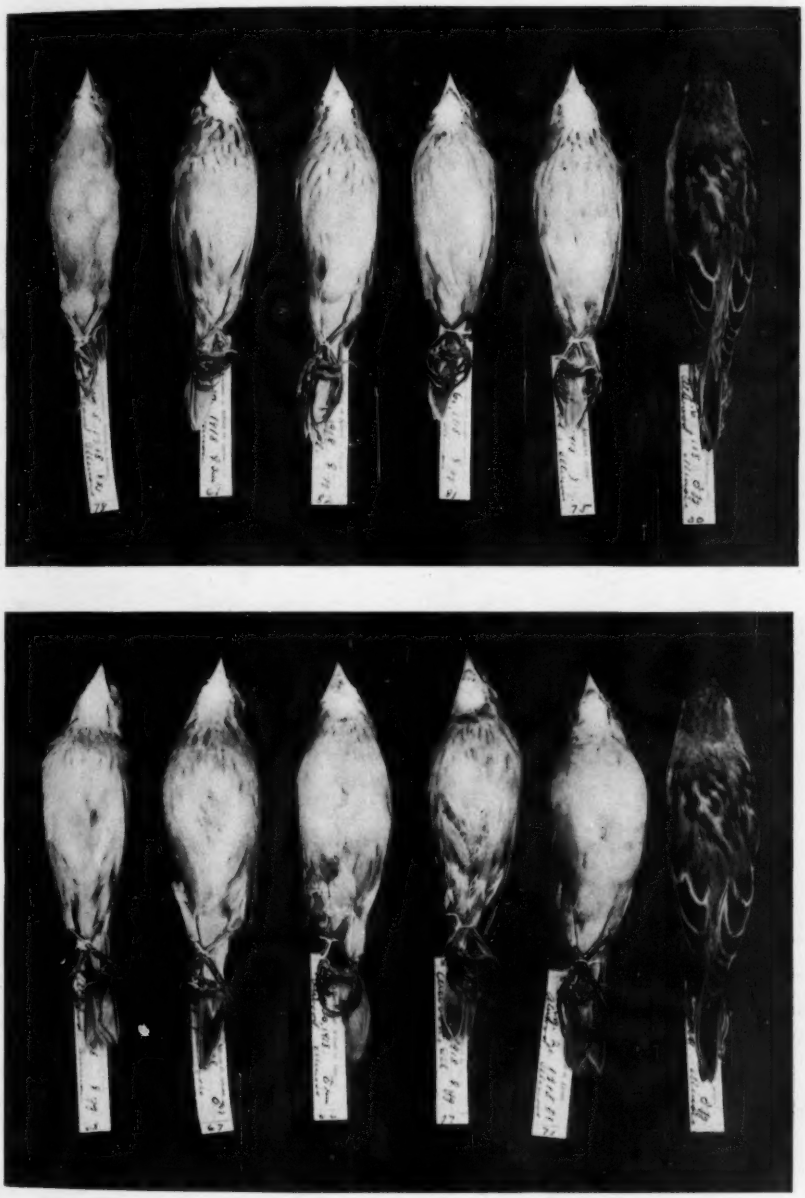
Plate IX, represents a Dickcissel fourteen days old, or six days after it had left the nest. The general coloration of the juvenal plumage of a bird fourteen days old is much duller as compared with the young at the time they leave the nest when the feathers are newly unsheathed. All are now unsheathed excepting the basal portions of the primaries and secondaries while the tail feathers have reached a centimeter and a half in length and are shown plainly in the general contour of the bird.

The ventral view shows the loose flimsy texture of the feathers of the ventral tract in the juvenal plumage which is in marked contrast to the feathers of the first winter plumage, in which the barbules are more closely and firmly interlocked. The partially spread wings show the relative amount of unsheathing of the feathers. See table XII for measurements.

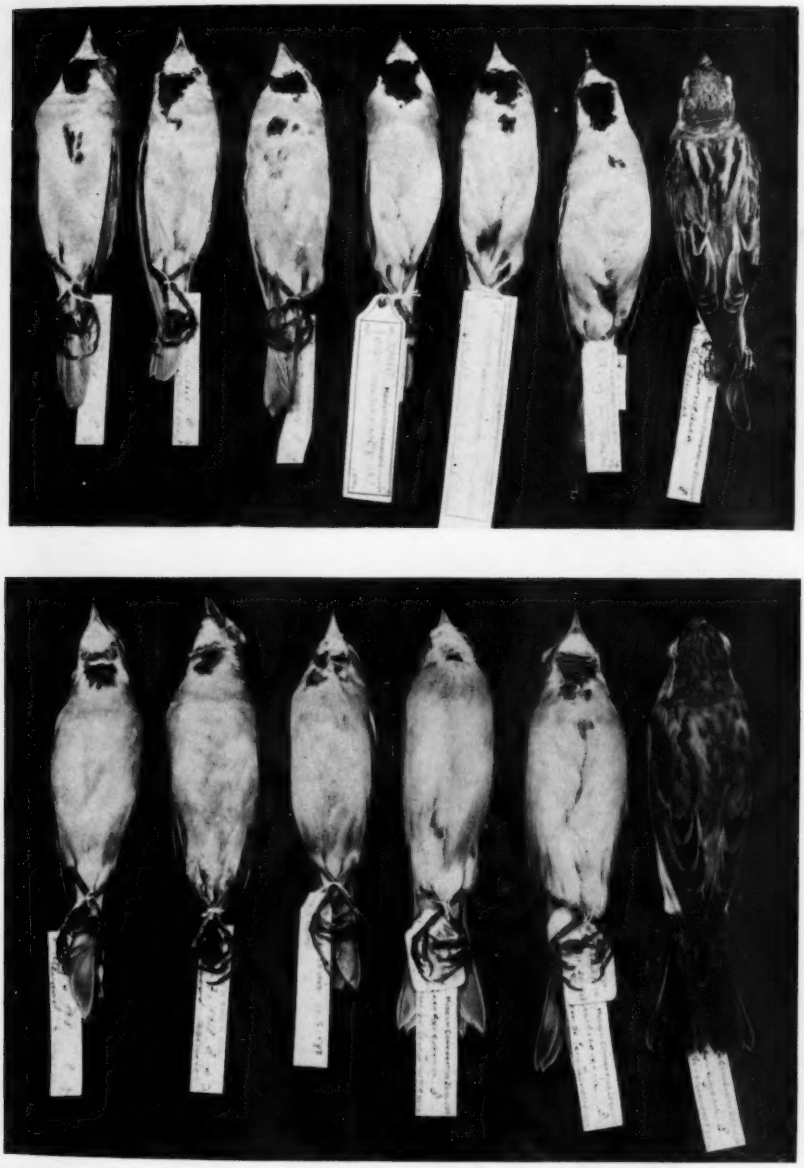
In Plate X, a Dickcissel in juvenal plumage eighteen days old, or ten days after having left the nest is shown. Note the great increase in the length of the tail, a growth correlated with its increased ability to fly.

This bird was able to fly almost as well as the adults with which it was associated. This tagged bird was collected about a mile away from the nest in which it was reared. See table XII for measurements and text page 177 for description.

Plate XI, shows twelve skins of the Dickcissel representing stages from the juvenal to the completed first winter plumage.

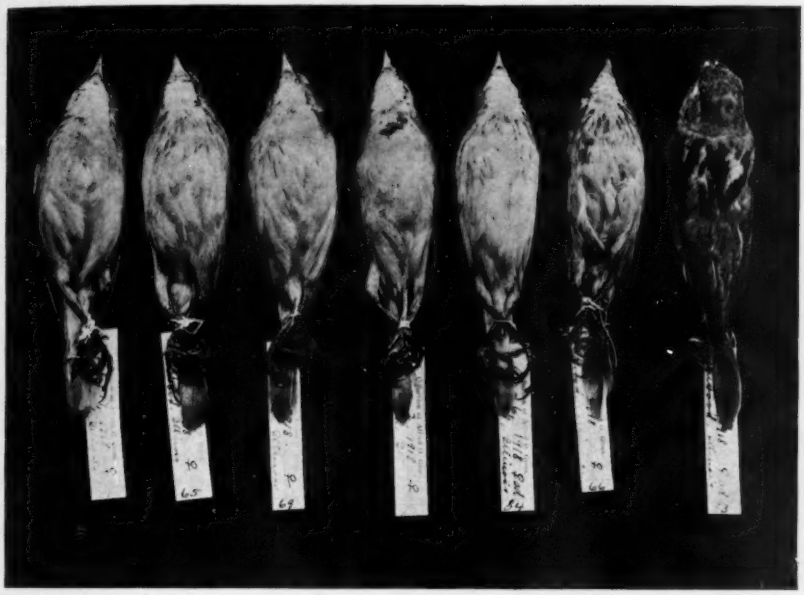


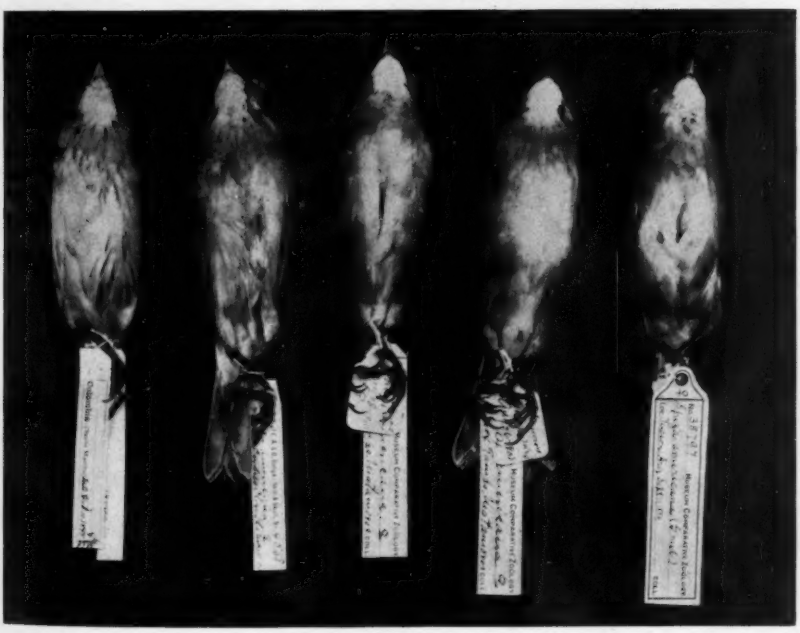
SKINS OF THE DICKCISSEL.
Showing Transition from Juvenal to First Winter Plumage.



MALE DICKCISSELS.

(*a*). Adult Nuptial Plumage.
(*b*). Adult Winter Plumage.





FEMALE DICKCISSELS.

(*a*). Adult Nuptial Plumage.

(*b*). Adult Winter Plumage.

Specimen No. 78 at the extreme left upper row is a female eighteen days old in juvenal plumage. All of the others are in progressive stages of the first winter plumage arranged in order, the more advanced stages being to the right. The youngest of these, a female five weeks old (specimen No. 61), has well defined streaks in the region of the breast and flanks but has very little yellow on the breast and belly. As one goes from the younger to the more advanced stages, of the first winter plumage, the streaks become less prominent and the yellow deeper in color and more extensive in area. The markings of the dorsal aspect of a bird in the first stages of the winter plumage is shown by specimen No. 80 at the extreme right. The lower row represents more advanced stages of the transition, birds which are estimated to be more than eight weeks old. See text page 178 for description.

MEASUREMENTS IN CENTIMETERS OF BIRDS SHOWN IN PLATE XI UPPER ROW

Specimen number..	78	61	82	81	75	80
Sex.....	♀	♀	♀	♀	♀	♂
Date collected (1918).....	Aug. 5	July 30	Aug. 6	Aug. 6	Aug. 2	Aug. 6
Age.....	18 days	5 weeks	About 6 to 8 weeks			
Bill.....	1.25	1.45	1.50	1.45	1.42	1.50
Wing.....	6.70	7.40	7.40	7.50	7.40	8.70
Length.....	13.30	15.75	15.80	16.10	16.25	17.80
Tail.....	3.80	5.55	5.65	5.30	5.40	6.30
Extent.....	22.80	24.50	23.60	24.30	24.60	27.50
Tarsus with toe....	4.60	4.40	4.50	4.60	4.80	4.90
Tip to tip of toes...	3.70	3.70	3.80	3.70	3.60	4.10
Third or front middle toe nail.....	.52	.60	.70	.62	.60	.68
First or hind toe nail.....	.70	.80	.80	.80	.78	.82
Sixth primary.....	4.80	5.15	5.00	5.10	5.00	5.50
Third secondary...	4.40	4.60	4.65	4.40	4.50	5.00
Weight (grams)....	26.60	29.50	28.60	31.13	27.10	36.70

LOWER ROW

Specimen number	68	67	62	77	71
Sex	♀	♂	♂	♀	♂
Date collected (1918)	Aug. 1	Aug. 1	July 30	Aug. 4	Aug. 2
Bill	1.40	1.55	1.55	1.50	1.45
Wing	7.60	8.40	7.95	8.10	8.20
Length	16.25	17.90	16.70	17.30	17.10
Tail	5.70	6.90	5.68	6.20	5.85
Extent	25.10	27.20	26.10	27.00	26.40
Tarsus with toe	4.70	4.90	4.72	4.90	4.90
Tip to tip of toes	3.90	3.90	3.90	3.90	4.20
Third or front middle toe nail	.70	.60	.61	.70	.70
First or hind toe nail	.82	.84	.86	.85	.90
Sixth primary	5.10	5.55	5.10	5.70	5.30
Third secondary	4.50	5.10	4.90	4.90	4.80
Weight (grams)	28.47	36.46	29.50	36.00	32.65

Plate XII represents a series of adult males, upper row in nuptial, lower in winter plumage. For measurements and description of specimens collected in Illinois see p. 15 and 16.

Plate XIII shows the adult females, the upper row in nuptial and the lower in winter plumage. Measurements and description of the former will be found on p. 16.

The latter are five skins from the collection of the Museum of Comparative Zoology and from left to right are as follows:

1. Colombia (Santa Marta) Feb. 11, 1898.
2. Corpus Christi, Texas, March 11, 1894.
3. Tamps, Matamoros, Mexico, Aug. 18, 1908.
4. Tamps, Matamoros, Mexico, Aug. 26, 1908.
5. Tucson, Arizona, Sept. 11, 1884.

The author cannot be positive whether these skins represent the adult or first winter plumage, as he has no osteological or other reliable characters upon which to base determinations of age. Nos. 1 and 2 as listed above more nearly approach Dr. Dwight's meagre description, than do the other three.

Searles Biological Laboratory Bowdoin College, Brunswick, Me.

A NESTING OF THE PHILADELPHIA VIREO.

BY HARRISON F. LEWIS.

(*Concluded from p. 44*).

July 4. The nest was observed from 6.15 a. m. to 6.25 a. m., during which time it was uncovered. At 6.40 a. m., when I approached to climb the nesting-tree, one bird was brooding. When I had reached a position where my head was but a foot below the nest I could hear the low "peep's" of the young birds issuing from beneath the parent. I observed also that the tips of the old bird's tail-feathers were becoming quite frayed. After it had flown away silently the young birds continued their cries unchanged. Two young only would raise their heads and open their mouths when the nest was touched, but those two would do it repeatedly. I could see a distinct line of down on each bird, extending from the top of its head along the nape of its neck and the middle of its back. Pin-feathers showed plainly in the young birds' wings.

The nest was observed at 7.25 a. m., 12.00 m., 12.25 p. m., 4.45 p. m., and 6.43 p. m., but at none of those hours was any bird seen on it. The break-up of regular, sustained brooding seems therefore to have come on July 3rd, two days after the last egg was hatched, as it will have been noted that the nest was uncovered when seen on the afternoon of that day. It is possible that the quarrel observed on the morning of that day bore some relation to this cessation of sustained brooding.

At 6.43 p. m. I climbed the nesting-tree, and when I reached a point where my head was about five feet below the nest I observed a parent Vireo, with food in its bill, on a small twig just below its home. The yellow of its underparts was particularly conspicuous at that time. It looked at me fixedly, but when I climbed two feet nearer to it, it flew away quietly. The young were found to be so large that their heads, when at rest, were on a level with the rim of the nest. Three of them repeatedly lifted their heads and opened their mouths when the nest was touched.

July 5. The nest was uncovered at 7.05 a. m., but at 7.25 a. m. a bird was seen on it.

At 6.10 p. m., when I took a position to observe the nest, no bird was on it. Both parent birds returned to it together at 6.12 p. m., but I was unable to see whether or not they fed the young. A few seconds later they departed, one after the other. At 6.21 p. m. one bird returned, fed the young, and immediately went away again. I climbed the nesting-tree at 6.22 p. m. and found the four young birds much larger than they were before. Their bills had become longer and more pointed, and had changed from yellow to light brown. All four of them would repeatedly lift their heads and open their mouths when the nest was touched. I took the top bird, probably the oldest, out of the nest to examine it more carefully. Its eyelids were open the merest slit. The pin-feathers on its upperparts were a dark bluish-gray and those on its sides and underparts were yellowish-white. An area of short pin-feathers covered practically all of the top of the head, from which a line of such pin-feathers extended down the nape of the neck and the middle of the back to the oil-gland. This line was sparse on the nape of the neck, while in a small area in the middle of the back it was twice its usual width. The pin-feathers on the wings were well-developed, those of the primaries being fully half an inch long. There was a small area of pin-feathers just above each leg. An area of pinfeathers covering the chin and throat divided just above the breast and passed in two broad bands, one on each side, along the sides of the body to a point well past the leg. The lower ends of these bands were each slightly forked. I replaced the young bird in the nest and descended to the ground at 6.29 p. m.

July 6. Between 12.51 p. m. and 2.35 p. m. the young were fed at 12.52, 1.17, 1.20, 1.28. 1.39, 1.46, 1.52 (twice), 1.54 (twice), 2.20, 2.27 and 2.29, a total of thirteen feedings in one hour and forty-four minutes. I have recorded two feedings at 1.52 p. m. because at that time I saw the two parent Vireos stand on opposite sides of the nest and both feed the young at once. At 1.54 both birds were in sight near the nest at once and they fed the young in quick succession. At 1.20 and again at 1.52 one of the old birds, after feeding the young, removed excrement from the

nest and flew away with it. The young birds were brooded from 12.52 to 1.16, from 1.28 to 1.36, from 1.39 to 1.46, and from 2.29 to 2.35, when I departed for a few minutes. A light rain began to fall at 2.34 p. m. When brooding, the old bird often poked its bill beneath its breast to the nestlings, whether for caress, punishment, or rearrangement of the young I cannot say.

At 2.41 p. m. I returned and climbed to the nest, on which the old bird sat closely, but which it finally left in silence. The cries of the young were very noticeable, both before and after the old bird left them. The young themselves were distinctly larger, and the pin-feathers on their heads were further developed than they were before. Their eyes were not yet wide open.

July 7. The young Vireos were fed at 6.25 a. m., immediately after which I climbed to their nest. All four of them lifted their heads and opened their mouths when the nest was touched, but they uttered fewer cries than they had done previously. They were sitting in the nest two abreast, all heads one way, with one pair on top of the other. The eyes of two of them were nearly wide open on this, the eighth day from the hatching of the first egg. I presumed that these two were the oldest (Bird I and Bird II), and could easily distinguish between Bird III and Bird IV. I took one of the two oldest birds from the nest to examine it more closely and found that on all the feather-tracts the pin-feathers had burst. The feathers on the head and back were light grayish-brown, those on the wings were dark gray, and those on the underparts were light yellow. Nine large primaries, each very nearly an inch long, and each overlaid by a covert about half an inch long, could be plainly seen. The outermost of these was about the same length as the sixth (the fourth, if counting from the inner primary). But outside of these large primaries and their coverts were two pin-feathers, not yet burst, about one-fourth of an inch long and of practically equal length. They were inserted one above the other, lying parallel with the large primaries and their coverts, and were very evidently the true first primary and its covert. On this eighth day of nestling life (for I was afterward able to make quite sure that the nestling examined at this time was the oldest of the brood) they are readily observed. I replaced the bird in the nest and descended to the ground at 6.35 a. m.

July 8. At 2.30 a. m. I took a position near the nest. There was a dead calm at the time, the cloudless sky, in which was no moon, was lighted brightly by stars, and along the eastern horizon the bright glow of dawn had already appeared. The temperature was 49°F. Nothing was heard or seen of Vireos of any species until 3.33 a. m., when a Red-eyed Vireo began to sing in the oak woods. A light breeze began to stir the leaves at 3.35. The true time of sun-rise at Quebec on this date was 3.59 a. m., but sunlight was first noticed on the tops of the tall pine-trees at 4.14 a. m. If one of the parent Philadelphia Vireos was on the nest during the night, it must have left it before there was enough light for me to distinguish it, for the first that I saw or heard of this species on this occasion was a visit to the nest by one of the old birds at 4.06 a. m., when the young were fed. The first song from the male Philadelphia Vireo was heard at 4.19 a. m. Between 4.00 a. m. and 7.00 a. m. the young were fed at the following times: 4.06, 4.17, 4.29, 4.31, 4.38, 4.39, 4.40, 4.42, 4.45, 4.48, 4.49, 4.50, 4.52, 4.55, 4.56 (twice), 5.30, 5.54, 5.55, 6.00, 6.02, 6.03, 6.04, 6.05, 6.09, 6.12, 6.15, 6.18 (twice), 6.21, 6.28, 6.30 (twice), 6.32, 6.35, and 6.51, a total of thirty-six feedings, or nine for each young bird, in the first three hours of morning activity. At the times which I have marked "twice" the two parent birds fed the young in quick succession; I did not on this date observe them both giving food at the same instant, as I did on July 6. Between 4.05 and 4.57 there were sixteen feedings, between 4.57 and 5.53 there was one feeding only, and between 5.53 and 6.53 there were nineteen feedings. It will be observed that the feedings exhibit a marked periodicity, as though the young were given regular meals, with intervals of comparative rest. A similar periodicity can be distinguished in the feedings recorded on the afternoon of July 6, there being on that date an interval of twenty-five minutes from 12.52 p. m. to 1.17 p. m. and another interval of twenty-five minutes from 1.55 p. m. to 2.20 p. m. during which the young were not fed, although they were fed quite frequently before, between, and after those periods. It would be very interesting to obtain a record of the meal-hours and rest-hours throughout an entire day. It may be thought that the parent birds were simply satisfying their own hunger

during the periods when the young were not being fed, but my observations on this morning of July 8 do not support this view. From 5.10 a. m., or slightly earlier, one of the adult Philadelphia Vireos, with food in its bill, was seen sitting quietly on an oak twig about two rods from the nest, turning its head at times from side to side. The young were not fed at all during the twenty minutes or more of its remaining in that position, but at 5.30 it finally went to the nest and gave the young the food which it had been holding in its bill. Again, for seventeen minutes, from 5.37 to 5.54, I observed one old bird, with food in its bill, sit quietly in an oak while the young were not fed. It eventually took the food to them at 5.55 a. m. It is easy to understand that, when food is very plentiful, the parent birds could, by ceaseless endeavor, gather much more than they and their brood could eat, but it is worth while noting that, instead of distributing their spare time among feedings at average intervals, or of relieving one another in the work, they both cease feeding together from time to time, thus marking off fairly distinct meal-hours for the young.

I saw that excrement was removed from the nest at 4.31 a. m., but it is probable that such nest-cleaning often took place without my being able to observe it. I also noted at this time that from the ground I could see the young birds moving about in the nest when no old bird was near, and could also hear their "peep's." I ceased observing at 7.00 a. m.

At 5.13 p. m. I climbed to the nest. No cries were heard from the young as I ascended the tree, and when the nest was touched two only would raise their heads and open their mouths. I removed from the nest and examined three of the young, no two of which were equally developed. The one most developed was fairly well covered with feathers on its head, back and wings. Its short first primary had not yet burst its sheath, although the covert over it had burst out and was growing rapidly, as were all the other coverts and primaries. I replaced the birds and descended to the ground at 5.26 p. m.

July 9. The nest was observed at 6.55 a. m., 7.25 a. m., 12.00 m., 12.25 p. m., and 4.00 p. m., but no adult Vireo was seen near it at those times. At 4.12 p. m., when I took a position to observe the nest, no old bird was in sight. At 4.25 the two parent Vireos

went to the nest together, perched on opposite sides of it, and both fed the young at once. They next seemed to be occupied for several seconds in working together over the young, shifting them about in the nest, or something of that sort. Then one, presumably the male, left and began to sing loudly from the oaks, while the other bird sat quietly beside the nest until 4.34, when she departed by short flights from branch to branch. At 4.44 p. m. I climbed to the nest without seeing anything of the adult Vireos. I removed all the young birds from the nest and examined them. The "peep's" uttered by the two older members of the brood had by this time developed quite a buzzy quality. These two showed plainly the white line over the eye. The oldest of all was very yellow on the underparts, while the three others had the underparts white, with a slight, but distinct, wash of yellow. Individual variation in the degree of yellowness of the underparts, which showed itself at this early age, remained present in a striking degree in this brood as long as I was able to watch them, and it is not improbable that it appears in the adult plumage also, which would explain the differing estimates of this coloration which different observers have made. I could not see any difference in the degree of yellowness of the underparts of the parents of this brood.

On the two older birds the sheath of the short first primary appeared at this time to have opened at the tip, but, instead of a vigorous quill, only a few hair-like barbs protruded from it. These were completely overshadowed by the covert, which was growing rapidly.

I replaced the young birds in the nest and descended to the ground at 4.59 p. m. On viewing the nest, I saw that its occupants were moving about a great deal. At 5.00 p. m. one old bird appeared, with food in its bill, and hopped excitedly about the nest. It gave its burden of food to one of the young, then flew to the next tree, where it moved rapidly about, with crest raised, uttering the scolding note. It gave the young no aid in readjusting themselves in the nest. The oldest of the brood finally stepped out onto the twig beside the nest, where it maintained its balance with difficulty. Both old birds were now present, scolding continually, but keeping well away from the nest.

At last the young bird fell headlong, but with great dexterity grasped another twig about eighteen inches below the nest, and maintained its grip there. I climbed the tree again and, as I drew near to the youngster, one only of the parents dashed at me, crest erect, scolding loudly and rapidly. This was continued until I left the tree and was the first scolding I had received from an old bird when I was in the tree. The only previous time when one of them made any audible protest on such an occasion was on the afternoon of July 3, when the female uttered a few squeaks. I replaced the young bird in the nest and descended to the ground at once. When I had stepped away from the tree I heard the cries of a nestling, as though it had left the nest while I was climbing down. I could not see it, but decided to go up the tree again, which I did, finding three young only in the nest. This time both old birds came close about me and scolded me vigorously. I could not find the stray nestling, so returned to the ground and left the vicinity.

When I returned, at 5.53 p. m., all seemed quiet, but after a little I heard repeatedly the buzzing "peep" of the oldest nestling. The note seemed to come from somewhere in the lower foliage of the tree, but it was only after a long search that I found the young bird, snugly esconced in the acute angle formed by the lowest fork of the tree, where the trunk divided into two nearly equal parts, at a height of about five feet from the ground. I was greatly surprised to find that it had descended nearly twenty feet through the tree without sustaining any injury. I replaced it in the nest at 6.10 p. m. At 6.35 I climbed the tree and found that it was still in the nest.

July 10. I climbed to the nest at 6.35 a. m. and at 4.24 p. m. The first time both old birds appeared and scolded me as I went up the nesting-tree. The four young in the nest would not lift their heads at all when the nest was touched at that time. In the afternoon, however, I saw nothing of the parents when I visited the nest, and three of the young would beg for food as usual when the nest was touched.

July 11. By this date the young were so large that their wings hung over the edge of the nest. At 6.10 p. m. I climbed the nesting-tree, without seeing the parent Vireos, and found in the

nest four well-feathered young, which did not raise their heads or open their mouths when the nest was touched.

July 12. A few notes of Philadelphia Vireo song were heard about 5.00 a. m. At 5.40 a. m. I heard the persistent notes of one of the nestlings and thought that it must be out of the nest. When I reached the vicinity of the nesting-tree, at 5.47 a. m., the begging notes of this young bird continued to issue from the neighborhood of the nest, while one old bird was scolding in another tree nearby. The young in the nest were fed at 5.48, 5.53, and 5.57 a. m. Soon afterward I caught sight of the young bird which was out of the nest. It was several feet from its old home and maintained itself on a twig with apparent ease. Sometimes it would move a few inches, from one twig to another, when it would gain a new foothold only after much fluttering.

It therefore appears that, with this species, the time from the hatching of the first egg to the departure of the first bird from the nest is thirteen days, although my frequent visits to the nest may have shortened the time slightly in this instance.

At 6.09 a. m., while one old bird scolded me, I climbed the tree to try to catch this young bird for a last examination of its appearance before it should become able to keep beyond my reach. In this endeavor I passed near, but below, the nest, when I heard another young Vireo flutter from it. I then held a mirror over the nest and saw in it two motionless young. The bird which I was trying to catch finally flew from the tree and alighted on a gravel roadway about sixty feet from its starting-point. It did not seem to be able to make an upward flight. I returned to the ground and picked it up. It did not attempt further flight, nor did it make any outcry when I took it in my hand. I found the second young bird on the ground about ten feet from the foot of the nesting-tree and picked it up also. Bird I was very yellow beneath, while on the back and on the top of the head the feathers were mouse-colored, but with yellow tips. The whitish line over the eye showed plainly. Some remnants of down were still to be seen. The flight-feathers and wing-coverts were a dark gray, mostly edged with yellow on their front edges. The bill was light brown, with the hook at the tip of the upper mandible well-developed. The iris was a very dark brown. The tail was not

more than five-eighths of an inch long. The short first primary was now well out of its sheath, and was about three-eighths of an inch long, all gray, and very distinct when sought for, but ordinarily concealed by its covert and by the large second primary. A view of the primaries from below at this time reminded me strongly of the cut of the primaries of the Warbling Vireo as shown by Coues.[4]

Bird II resembled Bird I, although slightly less developed, except that its underparts, instead of being yellow, were white with a yellowish wash, and that the feathers on the top of its head lacked the yellow tips.

I placed the young birds in the lower branches of the nesting-tree, where they stayed fairly well, although from time to time an attempt at flight would bring them fluttering to the ground. They were picked up each time, always without protest on their part, and replaced on a safe perch, for fear of cats. The parents fed them frequently, and seemed to try to entice them toward the refuge of the woods. At 6.45 a. m. Bird I was seen on a perch about eight feet from the ground in a tree some thirty feet from the nesting-tree, so that it was evidently learning the art of flight quite rapidly.

At 6.50 a. m. I found Bird III out of the nest and perched in the lower part of the woodbine which climbed on the front porch of the house. When I tried to pick it up it fluttered away from me and when I finally grasped it it screamed loudly for a second or two. This was the only time that it or any of the brood acted in this way when picked up. It resembled Bird II, except that the tips of the feathers of the back were slightly browner and less yellowish. It also was placed in a tree.

I was obliged to depart at 7.25 a. m., but during the morning Mrs. Lewis watched over the three young Vireos and replaced them on safe perches whenever they fluttered to the ground, which, she assured me, was quite frequently.

At 1.00 p. m. I found Bird I on a perch about fifteen feet from the ground, where he could hardly be seen. He was now silent nearly all the time except when being fed. A little later he moved

[4] Key to N. A. Birds, Fifth Ed. 1903.

to some other perch and I saw him no more. Birds II and III remained in the immediate vicinity all the afternoon and had to be picked up frequently. Bird IV remained alone in the nest and uttered a begging note similar to that of the other young birds of the brood. When a parent with food approached a juvenal out of the nest, the youngster, whether previously silent or begging, cried sharply in a screaming voice, with wings fluttering, body trembling, and mouth wide open, until it received the food. If one of them was held in the hand and its bill hit with a finger, it would act in a similar manner.

At 7.45 p. m., when dark was coming on, Birds II and III were seen perched on separate maple twigs, each with its head under its left wing, fast asleep.

July 13. The begging call of the young Philadelphia Vireos was first heard on this date at 3.48 a. m. When I went abroad at 8.10 a. m., quietness prevailed, but I soon found one young bird, probably Bird III, on a perch in the woods. It remained in that neighborhood throughout the day, being silent nearly all the time. I presumed that Bird II had made its way safely to the higher branches, beyond reach of my gaze.

At 9.02 a. m. I climbed to the nest and found Bird IV still in it. When I was not near it, it cried frequently. At 2.30 p. m. I found it on the ground about twenty feet from the foot of the nesting-tree and placed it on a twig near Bird III. These two birds resembled each other closely. At 4.35 p. m. I climbed to the nest to make certain that it was empty and that the last bird found was really Bird IV. Although the nest was empty and the young birds were two or three rods away, one parent bird, presumably the female, came close about me in the tree and scolded me vigorously. She was the only bird seen to feed Birds III and IV during the day.

At 7.42 p. m. these two young birds were seen fast asleep on maple twigs with their heads tucked under their right wings. Apparently they put their heads under either wing indifferently.

July 14. At 6.10 a. m. Birds III and IV were on their perches of the night before, but both were now silent except when they were about to be fed. A few minutes later I returned to find that Bird IV was still in its former place, but that Bird III had moved

elsewhere. I lacked time to search for it. Bird IV was noted again, for the last time, at 7.25 a. m.

At 12.00 m. I could see no Philadelphia Vireos in the vicinity, although I could hear the scolding note of one of the old birds far within the woods, where I had not time to seek it. I obtained no further observations of birds of this species which could be ascertained to belong to this family group. I shall be delighted if, in spite of my intrusions on their privacy, they return to nest near me next year.

The following is a brief outline of the chief events of this nesting:

June 12. Male seen chasing female.
June 13. Nest-building well advanced. Lining of nest not finished.
June 15. First egg laid.
June 18. Fourth (last) egg laid.
June 29. First egg hatched.
July 1. Third and fourth eggs hatched.
July 3. First cries of young heard.
July 12. Three oldest nestlings left nest.
July 13. Fourth nestling left nest.
July 14. Last observation of nestlings (two only).

NEST.

About four feet from the top of a young Rock Maple which was one of a row of such trees a small twig sprang at a considerable upward incline from the south side of the main stem of the tree, which was here one and one-fourth inches thick. The twig itself is one-fourth of an inch in thickness, and at a distance of one and one-eighth inches from the main trunk it divides at an angle of fifty degrees into two nearly equal parts, each of which is about five inches long and ends in a cluster of leaves. The pensile nest, which was well hidden and shaded by foliage, was hung from the fork between these two small twigs, at a height of twenty-four feet, eight inches, from the ground. Although the lower part of it is roughly circular, the rim is "gathered" to the twigs, so that the opening is shaped like a sector of a circle, with the two twigs

as radii, and the outer rim as the arc of the sector. The acute angle between the twigs is filled in for about three-quarters of an inch with nesting material. The "gathering" of the rim of the nest, causing the walls to be incurved at the top, must have been efficacious in retaining eggs and young within it when it tossed and swayed in the breeze, as it did very much in the slender top of the tree.

The inside dimensions of the nest are: along one radial side, 1⅞ inches; along the arc between the twigs, 2½ inches; maximum diameter within the bowl of the nest, 2⅛ inches; least depth (at center of arc), 1⅜ inches. The outside dimensions are: extreme width, 2⅝ inches; radial measurement from vertex of angle of twigs to outer extremity, 3¼ inches; least height (at center of arc) 2 inches. The thickness of the bottom of the nest is ⅝ of an inch, while the walls vary in thickness from ¼ of an inch to places where one can see through them readily.

The outside of the nest is composed of fine strips of the outer bark of White Birches, dead grass blades, coarse white hen feathers, bits of frayed white twine, one spider's white "cocoon," and much spiders' web. The birch bark is much the most conspicuous material. Ends of strips of it have been left loose, so that they flutter in the breeze, breaking up the outline of the nest and helping to conceal it. At points where strips of birch bark cross one another they sometimes seem to possess mutual adherence without visible binding material, as though they had been gummed together, perhaps by the bird's saliva. The nest is fastened to the twigs by spiders' web, strips of birch bark, string, and grass blades. The interior is lined chiefly with fine dead grass stems and flower-spikelets, but the lining includes also one or two needles of the White Pine and several white hen feathers, finer than those on the outside of the structure.

The nest has been presented to the Biological Museum of Laval University, Quebec.

VOICE.

The songs of the Philadelphia Vireo present marked peculiarities. The song heard from the male from June 13 to June 22, inclusive, was simple, but delightful; a low, sweet, gentle "Doo-

we? wheè-hooey; doo-we? wheè-hooey," uttered slowly and with long intervals between one utterance and the next. Sometimes the first utterance was elaborated into "Doodle-ee?." It was so low that it never would have been noticed by one who was not a bird-student, and it was so unlike the other Vireo songs with which I am familiar that I never should have thought the utterer a Vireo before seeing him. This song was uttered by a bird on the nest, by a bird hunting food, and by one bird when attending the other during nest-building. I cannot state positively that the female, as well as the male, utters it in its entirety, but I think that she does so, as I have heard her sing a loud "Doodle-ee?" This song was never sung frequently and was heard very rarely after June 22.

On June 21 I counted for five minutes the song-utterances of a bird which was singing this song among the oaks, and found the number of utterances per minute to be seven, seven, nine, eleven, and six, respectively. A similar count for one minute on June 22 of the utterances of a bird singing this song from the nest showed seventeen utterances to the minute, which I consider to be quite the highest rate at which I heard this song delivered.

A study of the songs of a number of Red-eyed Vireos about Quebec showed that they often contained "Wheè-hooey," but never "Doo-we?", with the sole exception of the song of the Red-eye which was neighbor in my shade trees to the Philadelphia Vireo. This bird sang both of the above-quoted utterances, which made me wonder if his song had been affected by that of his nearby relative. He and the other Red-eyed Vireos, however, uttered all their notes in their usual vigorous, matter-of-fact tone, very different from the sweet, low, gentle tone of this slow song of the Philadelphia Vireo.

On June 23, and often thereafter, the male Philadelphia Vireo sang a song altogether different from that which I have described. This new song was loud and vigorous, and was readily recognizable as a Vireo's song, although the tone in which it was given was not quite so full as is the tone of the song of the Red-eyed Vireo. It consisted of notes like "S-s-s-càpe! ee-òh-yuh! ee-yòit! chèebly!", and perhaps one or two others, repeated over and over in different orders. The utterance "S-s-s-càpe!", which was the

most striking part of the song, was sometimes rendered more completely as "S-s-s-càpe-s-s-s!". Very rarely two notes were uttered without any intervening pause. This song was sung very frequently from June 23 to July 4, although the bird was much more silent on cold, windy days than it was in fine weather. On June 24 I noted that the Philadelphia Vireo was singing far more persistently than was the neighboring Red-eye. Counts of its song-utterances for three minutes on that date gave twenty, twenty-eight, and twenty-nine phrases, respectively, per minute.

On June 25, when the female had left incubation to feed, the male, while following her through the lower branches of the trees, sang, in a loud voice, "Chee-òw-y! hee-ùh!," over and over again. This song was heard at such times only. Other loud songs which were heard often from this male after June 23 were "Whèe-hoit! s-s-s-jèrry!" and "S-s-s-chèw-ee! whèe-hooey!" After July 4 singing rapidly declined, the last song heard from this species being a few loud notes on July 17, three days after I ceased to find the juvenals.

A Philadelphia Vireo which was resident in 1919 in an area of White Birches about one hundred yards behind my house usually sang repeatedly, in a loud voice, "S-s-s-kòo-hee? s-s-s-kill-it-wàyw! s-s-s-wày-wer!" Other Philadelphia Vireos heard during the nesting-season sang similar loud songs, but the songs of no two of them were exactly alike. It would appear that, as with other common birds, the loud songs of individuals of this species differ, but are all specifically recognizable on account of similarity in quality and tone. I might point out that many common song-phrases of the Red-eyed Vireo, such as its plain little "Huh-huh," do not appear in any recognizable form in the songs of the Philadelphia Vireos heard by me, and that this seems to provide one ready means of distinguishing between the songs of the two species.

All the loud songs which I heard from Philadelphia Vireos were heard between June 23 and July 17, and this fact, combined with the inconspicuousness of the species and its similarity in appearance to other Vireos, seems to explain why so few specimens of this bird are noted in migration, and why Brewster, as he himself suggests, failed to find the species about Lake Umbagog between

May 12 and June 15 in 1896 and 1897, although he had formerly found it common there. If prior to the middle of June or later, this species is silent, or sings only in a low voice, unlike Vireo voices in general, it might easily be overlooked. A loud song heard by Brewster[2] at Lake Umbagog on June 14, 1903, may be found to be an exceptionally early one.

The only songs which I know with certainty were uttered by the female are two loud "Doodle-ee?'s," a few very low notes, and the song which she sang just after laying her last egg on June 18. This latter song was very sweet, clear, and simple, and was sung slowly for eight minutes in a low voice. It consisted of a variety of notes, such as "Hùllit; ee-dò-it; wày-wer; ee-chèw-ee; doo-we?; hùllit-whew!", uttered over and over in a different order each time. The effect was charming. Philipp and Bowdish[4] speak of the female singing from the nest in reply to the male, but I noticed nothing like this except that the female sang "Doodle-ee?" twice from the nest while the male was singing in the woods just after they had fought together furiously on the morning of July 3.

Other notes heard from the adult birds were a mouse-like squeaking, a scolding note, a fine "It, it, it, it, it," and (from the female only) a "Mew, mew." The squeaking seemed to be generally a love-making note, uttered when the birds were close together, though on July 3 it was uttered in protest against my presence at the nest, as well as during the quarrel between the adult Vireos. The scolding note resembled distantly that of the Red-eyed Vireo, but was not so loud and was shorter, harsher, and less resonant. It was often uttered three or four times in close succession. When the birds were very angry it became prolonged and double-syllabled, a grating "Ee-yùh!" The fine "It, it, it, it, it," which was uttered either when perching or when on the wing, seemed to be a conversational note, and reminded me much of a similar fine note of the Red-breasted Nuthatch. The "Mew, mew" of the female apparently indicated readiness for coition.

The first note of the young was a faint "Peep, peep, peep." By the time they left the nest this had become louder and harsher,

[2] 'The Auk' XX, pp. 369–376. October, 1903.
[4] 'The Auk' XXXIV, pp. 265–275. July, 1917.

a loud "Weh!", like the begging note of young Robins just out of the nest, but a little shorter and weaker than that. It was found by direct comparison to be much harsher than the begging note of a young Red-eyed Vireo. Sometimes it was two-syllabled and sounded like "Ke-wèh!". When a young bird was first out of the nest it uttered this note at frequent intervals as a begging call, but it appeared to cease using it as soon as it could accomplish a successful upward flight, generally within twenty-four hours after it had left the nest, this being in marked contrast to the continued use of the begging note by young Red-eyed Vireos. When a young Philadelphia Vireo was about to be fed it cried "Z-z-z, z-z-z-z, z-z-z," in loud, screaming tones.

FOOD AND FEEDING HABITS.

Food which I saw the adult Philadelphia Vireos take to their young consisted largely of naked caterpillars, brown, green, and whitish, and of flying insects of various kinds. On July 4 I saw the young being supplied with an insect which Mr. Dionne identified, from my description, as one of the Ephemeridae, probably *Palingenia bilineata*. When the nest was taken down, after the young had left it, it was found to contain the shell of a young snail (*Limnea* sp.?) and the remains of the abdomen of some small flying insect, such as a fly or a wasp.

The birds fed usually in the border of the woods, among the lower limbs of the Red Oaks and Red Maples, less often among the White Birches or the Rock Maples. The pair which resided among the White Birches a hundred yards behind my house probably fed among them.

I found the Philadelphia Vireos to be rather more active in their feeding-habits than are the Red-eyed Vireos. The trick mentioned by Dwight[5] of hanging back-downward, like a Chickadee, from a cluster of leaves while picking insects from it was observed frequently, but the majority of the food of this species seemed to be taken while the birds were on the wing. They would leap repeatedly into the air to snap up passing insects with distinct "click's" of the bill. At other times they were seen

[5] 'The Auk,' XIV, pp. 259–272, July, 1897.

hovering like Kinglets before branch-tips while they gathered food therefrom. The work done by this pair of Philadelphia Vireos must have aided greatly in keeping the trees in their vicinity free from insect pests this summer.

OTHER ACTIONS.

A third Philadelphia Vireo was seen several times in the vicinity of the nest. On July 1, at 5.38 p. m., one bird was seen to relieve the other on the nest while a Philadelphia Vireo sang continually from among the oak trees. On July 8, at 6.03 a. m., the female was about to feed the young birds, while the male sang nearby, when a third bird of this species approached the female. The singing male darted at him and chased him about for two or three minutes, until at last he departed. While the chase was going on the female continued to feed the young. At 6.05 a. m. two old birds were peacefully beside the nest, where one of them fed the young, while the song of a Philadelphia Vireo came from the oaks. On the morning of July 12, when the young birds were leaving the nest, I thought I saw three adults of the species about, and, by "squeaking," I was able to bring all three into view in front of me for a moment.

The three Philadelphia Vireos remained about the young all that day, and one of them was observed to chase the female frequently while she was seeking food and bringing it to the young. At such times the pursuer uttered the fine "It, it, it, it, it." The next day, July 13, similar pursuits were seen, but the female appeared to take more kindly to them. Several times in the morning and once in the afternoon she was noticed to fly toward her pursuer, perch, lift her tail, and cry "'Mew, mew," immediately after which coition apparently took place. Sometimes this occurred while another male Philadelphia Vireo sang very near at hand. Although I watched closely, I was not able to discover any other signs of the rearing of a second brood.

In the afternoon of July 13 a young Red-eyed Vireo just able to fly wandered near the young Philadelphia Vireos, and in consequence the two busy mother birds met frequently while seeking food for their respective young. At such times they would quarrel violently, and the Philadelphia Vireo was always driven some dis-

tance away. Each time she returned to her duties as quickly as possible.

ABUNDANCE

The particular pair of Philadelphia Vireos whose nesting I have described took up most of my spare time during the nesting-season of 1919, which was my first nesting-season at Quebec. In consequence, I did not obtain much information regarding the abundance of this species in this vicinity at that season. Altogether I noted seven singing males of this species, besides the apparent intruder on the family life of the pair near my house. Of these seven, one nested in my yard, one resided in the White Birches one hundred yards or so behind my house, and the third lived in shade trees near a house about one-quarter of a mile away. The four others were heard singing on a trip made on June 30 to the valley of the lower Montmorency River, about ten or twelve miles northeast of Quebec. Two of them were in hardwood second-growth on poor, sandy land, and the other two were in alders beside the river, all at an elevation of from three hundred to five hundred feet above sea-level. Choosing one individual, out of the four, I followed up the song to verify identification by looking at the bird, and saw it plainly for some time at a distance of six feet, identifying it beyond question. Probably the species is not uncommon about Quebec.

It has never been recorded from this vicinity before, and indeed I can find only two records of its occurrence in the province, that of Dwight[1] of birds seen and taken at Tadousac, about one hundred twenty miles northeast of Quebec, and a record mentioned by Brewster[2] of a breeding specimen taken in Quebec Province near Ottawa.

Bergerville, P. Q., Canada

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[1] 'The Auk,' XIV, pp. 259–272. July, 1897.
[2] 'The Auk,' XX, pp. 369–376. October, 1903.

NESTING HABITS OF THE NIGHTHAWK AT TACOMA, WASH.

BY J. HOOPER BOWLES

At about 7.30 p. m. on June 22, 1919, a friend asked me to come and see a young owl that was perched on the roof of a nearby house in Tacoma, Wash. Hurrying down I saw a bird sitting perfectly upright on the ridgepole, which certainly looked very much like a fluffy young Screech Owl. I suggested that we watch it for a while as it looked suspicious. To make a long story short, about an hour and a half later it suddenly collapsed to about a third of its former size, gave a screech and sailed off, a very able-bodied adult Nighthawk. This was the first time I had ever seen a bird of this family, resting in any other than a flat position. It at once skimmed over the roof of a neighboring building and mounted above it several hundred feet in the air, when it dropped like a plummet to within a yard of the roof, then sheared off and repeated the act. On the downward swoops it gave the peculiar bellowing note, which has earned it the name of "Bull-bat." This has been attributed to the air blowing into the wide open mouth, but seems really to be due to its passage between the primaries. This performance was the courtship of the male to his mate on the gravel roof. A few days previous my attention was called to a Nighthawk courtship directly over the apartment house in which I live. Consequently, on July 4, 1919, I considered it high time to investigate, as the janitor was cleaning off the roof, and the following observations resulted.

The Nighthawk of Tacoma seems to be intermediate between *Chordeiles virginianus virginianus* and *C. v. hesperis* though probably nearer to the latter.

July 4, 1919. Found a nest on the roof, after bird had been frightened away by a man. The parent was rather wild, staying on the roof of a building opposite. Weather cool, but sun out Photographs of nest taken, when eggs were two inches apart, as left by bird.

July 6. Visited the Nighthawk nest and found the bird on. She would not let me get nearer than twenty feet before leaving the nest, when she flew to the opposite building as before, remaining there until I left. The eggs today were touching each other when the bird left them.

July 9. Visited the Nighthawk nest and found bird on, but she would not let me get any nearer than last time before leaving. This time she did not fly from the roof of the building, but alighted about seventy-five feet away. Sun shining and exceedingly hot so that I had difficulty in getting onto the roof as I could not touch my hand to it without burning. The eggs were about an inch apart, and I was afraid the heat would roast them. I believe the bird felt the same way about it, as I had no sooner climbed into the hole in the roof than she at once flew to within three feet of the eggs. She hesitated a few seconds and then walked rapidly to them and settled on them, tucking them into place under her with her bill and chin. I waited a few minutes and then made an attempt to photograph her, but she flew at once, alighting on the roof about the same place as before. I at once retired to the hole and she, as quickly, flew back to look after her eggs. This time she dropped about ten feet away from them and the bright sunshine evidently made her sight very imperfect. She walked towards the eggs, but before coming near them turned to one side and settled upon an egg-shaped pebble. She did not discover her mistake until she tried to tuck it in under her, when she promptly left it and started again towards the eggs, only to be again turned aside by another pebble. The same actions were repeated, but the third attempt brought her safely to her eggs which she tucked under her with every evidence of satisfaction. One thing that greatly surprised me was the ease and rapidity with which she walked, which would seem impossible for a bird with such very small and weak feet and legs. She stood high up and walked as rapidly as a pigeon and with much the same gait, although there was no motion of the body as in pigeons. In fact perhaps the action might better be likened to a sandpiper, although she did not lean over as they do.

So far only one bird had been seen, and I was curious to know where her mate keeps himself.

July 11. Visited the Nighthawk nest and found the bird on, but she acted precisely as before alighting at the same spot on the roof. The day was overcast and decidedly cool. I believe this is the reason that the bird did not return to the nest for ten minutes after I retired to the hole in the roof. She finally dropped about five feet from the eggs and stayed there watching for about two minutes, then walked to the eggs and settled upon them, tucking them carefully into place as before. This time she did not stand high as she walked, and her body leaned over precisely like a sandpiper, which she strongly suggested in her action. So far she had uttered no call note of any kind.

July 13. Visited the Nighthawk nest at 11.45 a. m., when I found the female on the nest, as usual. Upon flushing her I found both eggs hatched, but on one of the young the down was not completely dry, and the egg shell was still in the nest. Only a small portion of the other egg shell was in sight and the young bird while completely dry, was for some reason not as lively as the newly hatched one.

The female allowed me to come within six feet of her, which gave me a chance to take her photograph. She then flew about twenty feet and dropped to the roof, fluttering along as I followed her. After photographing the young I took the empty shell out of the nest, which act caused the newly hatched bird to jump out of the nest about an inch. When I stepped back he promptly walked back to the nest again. I was greatly surprised at the strength of this tiny bird, which could not have been out of the egg more than a very few minutes. Its movements were quick and strong, and I was again reminded of a sandpiper. The young had a coat of rather long down. The nest is simply a circle two- and three-quarter inches in diameter, which is scraped clean of pebbles, but it is evidently well recognized as the home site.

The day was bright and sunny, but there was a cool wind blowing strongly, so I did not stay any longer than was necessary to take photographs, as I feared the newly hatched young might possibly become chilled. The older of the two little ones kept up a continuous "peep, peep," but made hardly any movement. The younger one did not make a sound, but showed plenty of action. The eyes of both were open. I know of no family of

land birds in which the newly hatched young at all approach this development, excepting the *Gallinae.*

July 14. Found the bird with her young but she flushed at twenty feet distant. The young had grown astonishingly since yesterday and were a couple of feet from the nest site, sitting side by side. I examined their legs and feet and was surprised to find them large and strongly developed, which accounted for their ability to move about so quickly.

The parent returned to within a few feet of her young very soon after I retired to the hole in the roof. She walked hurriedly to them and settled about an inch away, when they at once ran in under the shelter of her feathers. They made no sound today, even when I handled them, and the parent has never uttered a note in my hearing. The color of the down on the young is a buffy gray, with shadings here and there of lavendar brown.

July 15. Today has been extremely hot, the hottest of the season, and I decided not to visit the Nighthawk until evening hoping to see the young fed. While standing below, last evening I saw the female leave the roof and begin feeding at 9.15, so tonight I went up at 9.00 and found her covering her young. They were about twenty feet from the original site and close to a chimney the change very possibly being made for shade, as the heat today up there must have been intolerable to anything but a Nighthawk. I was surprised to find that, in spite of the twilight, she let me come within five feet of her before leaving. She flew about fifteen feet and then lay on the roof with wings outspread and mouth wide open but made no sound whatever. I retired to my hole in the roof and, after about five minutes, was much pleased to see her take wing and commence feeding. This she continued to do for ten minutes, following a circle with a radius of three or four hundred yards, during which time I saw no other bird of this species. The young meanwhile had remained motionless, stretched out perfectly flat, a great stride in intelligence over yesterday when they knew no better than to sit with their heads up. When the female returned she dropped about ten feet from them and watched my hiding place intently for several minutes, then walked directly to her young. As soon as she reached them they began a veritable dance, standing high on their legs and flapping their little

wings as they tried to reach her mouth, their own mouths extended to the utmost. She fed them largely by regurgitation, as might be expected, seeming to favor one more than the other, and putting the food into their mouths very deliberately. After finishing she settled down over them and I awaited further developments. I had almost decided that everything was over for the evening when I heard a familiar screech in the distance and soon another Nighthawk sailed high overhead, circling ever nearer with an occasional screech. It seemed very suspicious, making several feints at alighting before it finally did so about fifteen feet from the female and young. The white patch in the tail and the white throat identified this bird as a male, and I was glad to find that he had not deserted his family, as does his near relative the hummingbird. He stood watchfully for some time and then walked swiftly to his mate, who had not made the least sign of recognition. As he reached her she walked away a couple of feet from the young, who greeted their father literally with open arms. I have never seen a bird of any kind stand as erect as these baby Nighthawks. With their heavy coats of down and waving downy wings they reminded me of a pair of tiny dancing bears, for they were able to stand upright for at least a minute. The male fed them equally and evidently had a considerable supply of food, as he went through the motions of regurgitation frequently. The female had walked around to my side of them and, when he left, she walked at once to the young and covered them. I waited for some time but, as the male did not come back and the female seemed asleep, I concluded that the performance was over.

July 16. I visited the Nighthawks at 7.30 p. m. and found the female covering the young. She is becoming much tamer and let me come within five feet before flushing, dropping to the roof a few feet away with outstretched wings. I lifted one of the young to its feet, when it ran at a good pace for about twenty feet before stopping, standing very upright all the while. The young are now only three days old, but are as active as young quail of the same age, which they resemble very closely. The parent bird made a wise selection when she chose a roof with a wall all around it.

July 17. Visited the Nighthawks at 9.00 a. m. The female acted the same as last night, but, while stretched on the roof after leaving the young, emitted a very faint hiss—the first sound of any kind I have heard from her. I was some time in taking pictures and testing the strength of the young. When trying to run their fastest, they flap their wings, which seems to help them in maintaining a more upright attitude. When I finally retired to the hole in the roof the female at once ran to them, when they sought shelter under her. Although she had been away from them fully as long as when she gathered food in the evening, they made no motions at all as if desiring anything to eat, and evidently did not expect anything. This seems very unusual for young birds. Their sight is good in the daylight. They must run about a good deal at night, as I never know where to find them now, when I go up.

July 18. Visited the Nighthawks at 9.30 p. m. Neither of the parent birds was present and the young were side by side facing in opposite directions, as is always the case with young hummingbirds in the nest. I have been watching for this, because of the close relationship of the two groups, but it has not happened before.

I sat down a short distance away and, after waiting about ten minutes, the male appeared and circled around. At times he came within ten feet, uttering an occasional screech, after which he settled about fifteen feet from the young. Hesitating for a minute, he then walked to within a foot of them and they ran to him as usual, but the manner of feeding was completely changed, The parent crouched flat and opened his mouth wide, while the young stood up and plunged in their heads, rooting around like a couple of little pigs for their food. After the male had left it was some time before the female appeared, and she flew directly to the young without paying any attention to me—I believe she is becoming accustomed to human beings. This time she left promptly after feeding the young, and it was too dark to distinguish whether she fed them in the same manner as the male. Neither parent appeared again for some time, when the male came, and after flying around for inspection as before, dropped to the roof a few feet away and on the opposite side of me from

the young. He then began quacking rapidly, precisely like an immature duck on a small scale, the sound being best spelled "pfat." Between intervals of quacking he would make a sound like the soft twanging of a bowstring, which he would repeat a number of times. The female joined him before long and, after waiting some minutes without results, I left them as it was getting late.

July 21. The primary pin-feathers of the young Nighthawks are about a quarter of an inch long. The birds are now eight days old, so their growth seems exceedingly slow for a small bird. The female flew around a little and then perched on a ridgepole in the same position as the male described in the first part of this article. The female has become so tame that I almost have to touch her before she will leave, and I have photographed her at a distance of three feet.

Ever since they were first hatched the color and actions of the young have been so similar to young quail, or grouse, that a few feet away it would have been difficult to distinguish a mixed lot. To be sure, the young Nighthawks do not pick food off the ground.

July 22. Visited the Nighthawks a little before dusk and found neither parent bird at hand, the young being at least seventy-five feet from where they were yesterday. I sat down against a chimney close to them and the female soon came, dropping to the roof about twenty feet away. She has grown so accustomed to me that evidently I am part of her daily routine, so she walked promptly to the young and fed them. This was done in a still different manner than before, as she at once thrust her beak far down their throats and fed them with the same violent pumping motion that is so familiar in the hummingbirds. After feeding both young in this manner, she settled down and allowed them to forage for remnants in her wide open mouth. After they had finished they crept in under her. The male came shortly after this, but he would not go to them while I was in sight. He is tamer than before, flying slowly within four or five feet of me and dropping to the roof only fifteen or twenty feet away, where he quacks.

July 24. Visited the Nighthawks in the morning this time, the weather being sunny and cool. The female is so tame that she

is hardly interesting. When I make her get off the young she simply squats on the roof a few feet away and dozes until I leave. The young exhibit an astonishing feather growth, as rapid as it seemed slow at first. Many of the smaller feathers on the wings look fully developed, where there seemed no sign of them on the 21st. I photographed them, but both young and adult are so exactly the color of the gravel that it is difficult to distinguish them. For several days now the young have been facing in opposite directions, side by side, as is the case with young hummingbirds. One of them always has most of his body in plain sight, only his head being under the old bird. A most comical reminder of the fabled ostrich, who puts his head in the sand and believes himself completely hidden.

July 26. Visited the Nighthawks about 10 a. m. and found both young squatting together about a foot from the female; they were not facing in opposite directions today.

July 28. Visited the Nighthawks about 11.15 a. m., the weather is sunny, but not very hot. All three birds were in the same position as on the 26th, and I photographed the group at a three foot range. The young are getting well feathered and look more than ever like quail or grouse, and they can certainly run fully as fast, if not faster. When running fast they spread the wings occasionally, as when a day or two old, but do not flap, seeming to anticipate the aeroplane results that will come when they get a little older. The female parent is as tame as an old hen, and not nearly as fussy.

July 29. Visited the Nighthawks with Mr. Kitchin at 8.45 p. m. The two young were sitting close together, facing in the same direction, but neither parent was present. We sat down about twenty feet away, with our backs against a chimney, and awaited further results. It was some fifteen minutes before either parent appeared, during which time a flock of nineteen Purple Martins flew over "chirruping" lustily. This is much too early for them to be migrating, so we decided that they must be three or four families of young being taught to catch food by their parents.

The first Nighthawk to appear was the male, who flew close to us, but did not stop and did not appear again. Shortly after-

ward the female came and fed the least developed of the young, which I suppose is the younger of the two. Both young ran to her to be fed and, when she left, remained in a standing position, We walked up to examine them, when, to our astonishment, the older one rose in the air and flew over the edge of the roof. Naturally he seemed rather uncertain of his ability, for there is hardly a doubt that this was the first flight he ever made. I am positive that he was quite unable to fly yesterday. We peered over the edge of the roof and were again surprised to see him perched on a six inch railing about ten feet down—he surely must have circled in the air and come back in order to reach this. It seemed as if the parents would have a hard time finding him, and we felt that our prospects were cut in two, but we sat down again to watch and try to make the best of an unfortunate mistake. After about twenty minutes the female returned to the roof close to us and stood bobbing her head up and down, evidently being at once aware of the fact that there was one baby missing, The remaining young one never moved a muscle, a remarkable contrast to the usual antics when the parent comes with food, and it was evident that he either had not been given the signal to move, or else that he also felt that all was not right. Presently the female rose and circled low around the building, returning to the middle of the roof. She had scarcely alighted when the missing baby flew up over the edge of the roof and landed in almost the same spot where we found him in the early evening. If we were astonished at his first flight, we were dumbfounded at this. Never before had we seen anything to approach such intelligence in such a very young bird. It could hardly have been a mere accident, and I was at once reminded of the way one of the young had hopped in and out of the nesting place on the day it was hatched. As soon as he had alighted a signal was evidently given, and both young promptly flew to the parent and were fed, the younger one being scarcely able to raise himself off the roof. The feeding tonight was done, as for some days now, by the parent holding its beak far down the throat of the young and pumping violently.

It is most interesting to note the size and color of the young birds. The older one is as brown as a young grouse, while the younger is a pale gray. They are about two-thirds as large as

the adults, being just about the size of a Poor-will (*Phalaenoptilus*). The feathers of the primaries are not as long as they will be, but, otherwise, the older of the two seems to be a perfectly proportioned miniature of an adult bird though the coloring is different. They are very much stronger on their legs than the adults, and I wonder at what stage this agility begins to diminish.

July 30. Visited the Nighthawks at 11.30 a. m., the weather being cool and moderately sunny. Neither parent was present, or came in sight while I was there. Both young were side by side, facing the same way, and I took good care not to disturb them.

August 1. Visited the Nighthawks at about noon and found the female sitting between them, with a wing spread over each. The weather was warm and overcast, so I could see no reason for this protection. For some time they have had none of this protection on my visits, even when the weather was decidedly cool.

August 2. At noon today the Nighthawks were in the same position as yesterday, although there seemed no reason for it.

August 3. This morning I found the female sheltering only the younger of her babies, the older one having disappeared. This remaining youngster is fully feathered now, excepting for his short primaries and tail-feathers and is a beautiful little bird. Reddish brown, with broad smears of lavender and silver gray here and there in his plumage. About two-thirds the size of the adult, he reminds me more than ever of a Poor-will. If I had been hunting in the country and collected these two young birds I should have believed I had discovered a new species.

After considerable search I made out the absent young one on a neighboring roof, apparently perfectly at his ease. It is rather surprising that he stayed at home as long as he did.

Went up in the afternoon and found the home young one alone. Took his picture at two and a half feet range. Could see nothing of the other young one on the opposite roof. He is three weeks old today.

Went up in the evening at 8.15 and the home young one was alone, so I sat down to wait. For a while he was absolutely motionless; a Martin flying overhead chattering did not move him a particle. Then a Nighthawk passed over, high up, when he at once showed that he was not asleep, and how keen his eye-

sight was, by promptly looking up. A short time after this he commenced a series of gapings, which ended by his disgorging a large pellet, exactly in the manner of an owl. The light was beginning to fail now and he seemed more lively, stretching his wings and preening himself vigorously all over. He then walked away about ten feet and I went over to get the pellet, as I feared to lose it in the darkness. While I was looking it over the little bird took wing, circling some distance away from the house, but swinging around and alighting at the further end of the roof, some seventy-five feet away. I at once returned to my seat, and the small bird was almost equally prompt in flying back to the home roost. At three minutes of nine the female came and gave a very hurried feeding, followed about five minutes afterward by the male, who did likewise. It is the only time the male has dared to feed the young when I was close by and I doubt if he saw me this time, although very near. The young bird became very lively after this, taking numerous short flights, at one time going clear away from the building. However, he always returned to the home roost in the course of time, but every time I thought he must surely lose his bearings. It certainly is astonishing that such very young birds can have so much sagacity.

The manner of walking is now completely changed, the position of the body being horizontal instead of upright. This is, of course, owingto the long wing feathers making an upright position impossible. For the same reason, doubtless, the walking is much more labored and awkward, being almost exactly like that of the adult. Evidently this is the transition stage, where the feet and legs begin to lose their strength from lack of use, wing power being resorted to almost altogether. The female fed him once after this, when I left on account of darkness.

A close examination of the pellet disgorged by the young bird showed it to be nearly three-quarters of an inch long, by about a half an inch through. The contents consisted of the legs and other portions of soft insects and beetles, and ten pieces of clam shell. One of these pieces of shell was five-eighths of an inch long, which seemed a most formidable object to feed to a baby. Small wonder that it failed to prove digestible, making the disgorging of the pellet necessary.

August 4. Visited the Nighthawks this afternoon, when there was a slight rain. The female was beside the young one close to the wall, her feathers on one side up over him. He has certainly grown since yesterday and looks fully three-quarters as large as the old one. While I stood watching them he walked around in front of his mother and crawled in under her headfirst, boosting her clear over onto one side and leaving the greater part of him sticking out in front. It was a most amusing sight. He evidently did not figure that he had grown since his downy stage when he, the weaker of the two young, was always the one to be found with his head covered up. He is anything but a weakling now, but it is easy to see that he is still "the baby" of the family. How true the old saying is that, "One touch of nature makes the whole world kin."

August 5. Found the female sheltering the young bird today.

August 6. Found the young bird alone today, but both parents were flying around in the vicinity, although it was hot and the sun was shining brightly. They seemed to be gathering food and were as quick and certain in their movements as they are at dusk. This is the first time I have seen them hunting in the vicinity of the nest, as before this they must have gone a very considerable distance in order to get the kind of food required.

August 10. The young Nighthawk has been alone at all my visits during the day ever since August 6th. This evening I kept watch from the opposite sidewalk and about half past eight both parent birds appeared, repeatedly swooping down close to the roof and up again, as if trying to make the young bird join them. The female fed it but once, the male not at all. The male did a great deal of screaming, which is unusual of late, and at times swooped down past the female with the harsh "swuak" that very evidently took the place of singing during courtship. Occasionally the two adults joined by a Nighthawk with much shorter wings that I believe was, beyond a doubt, the other young bird. In direct flight he could do nearly as well as the old birds, but he fluttered considerably when making sharp angles and curves.

The performance on the roof looked interesting, so I went up at about 9 o'clock and nearly stepped on the young one as he was on the other side of the roof from the usual place. I sat down to

watch and both parents came, one at a time, and fluttered over him in a fruitless effort to make him join them. They would not feed him at all, but the most he would do was to flap along the roof. Finally they disappeared and the youngster, after waiting a while, took a long flight on his own account. He stayed away for at least a minute, and shortly afterward repeated the act, but I could not make out where he went, as it was getting dark and he did not fly above the skyline. While he was away the second time the male dropped to the roof very close to me and quacked a few times, which I think is a note of caution, but he soon stopped as he was not at all afraid of me now. The young bird soon flew past and dropped over in his regular place, when the male uttered a few times the soft note like a twanging string. After this, as far as I could tell, everything settled down for the night.

August 14. The young Nighthawk was a month (31 days) old yesterday. He was on the same place on the roof both yesterday and today, alone, as has been the case for some time. He was very wide awake and did not seem at all afraid of me, doubtless considering me a natural event in life. I wished to see how readily he would walk, or run, so approached within two feet, at which he stood up and gave a protesting screech. He did not attempt to walk, and I went no nearer as I feared he might fly and not return, which would spoil my study of how long he would stick to his home under normal conditions. Evidently the instinct to run, as a means of escape, is lost very soon after the power of flight is attained. The screech that he gave was very satisfactory as it proved that he was a male, as his gray plumage has led me to suspect.

August 17. The young Nighthawk was still on the roof, alone and in the same place.

August 18. Went on the roof today in the early evening and found no Nighthawks in sight anywhere. It seems probable that the young bird left last night, which would make him thirty-five days old at leaving the home roof.

I searched carefully for more ejected pellets, but found only one. This was exactly like the other and, although I have kept it unbroken, numerous bits of clam shell in it give evidence that the contents of both are much the same. It really begins to look

as if pieces of clam shell were given the young bird for medical purposes.

In summing up the above notes a few interesting contrasts and similarities may be drawn between the Nighthawks and some of their nearest relatives. The young resemble hummingbirds in their characteristics more closely than any other family, although differing widely in some ways. First, there are always two of them; second, excepting for a very short period, they are always fed by regurgitation, the food being violently pumped into them; third, for a very considerable period of time they sit side by side, facing in opposite directions, which is always the habit of young hummingbirds in their nest.

On the other hand the hummingbirds are born blind and absolutely helpless, so I think the most unexpected thing to me about the young Nighthawks was their strength, keen eyesight, and quick-wittedness as soon as hatched. In this respect, with the addition of the heavy coat of down, they are utterly unlike any of their near relatives with which I am acquainted. This applies especially to young woodpeckers, which are blind, entirely naked, and utterly helpless for several days after hatching.

Their actions and general resemblance, until their primaries began to lengthen, were so strongly suggestive of an abnormally smart young grouse that we must wonder what manner of birds their remote ancestors could have been. What could have happened in those early days to have transformed them, from sturdy legged runners, into one of the most graceful and spectacular of our flying birds. This transformation, as the young develop, is so sudden and complete that to the student of evolution it is the most interesting feature of all. The adult bird, although stronger on its legs than we might think, would be unable to keep pace for two seconds with a young one a week old.

From the actions of these two young ones, I believe that as a rule Nighthawks can fly about and gather food for themselves at the age of about one month, hardly any sooner, in spite of the fact that they can fly fairly well some days earlier. Although the last bird was thirty-four days old before he left the roof for good, there is no doubt that he was what, in human beings, would be called badly spoiled. He could fly perfectly well, but simply

would not work for his food so long as his parents would go and bring it to him. The first young one was only twenty-one days old when it left the home roof for good, although it could hardly have fed itself for some time afterwards.

Judging from the fact that one young bird was brown, I believe it was a female, while the one that was mostly gray I believe was certainly a male on account of his screech.

The call notes were very interesting, although the female made no sound beyond an occasional faint hiss. The quacking of the male is undoubtedly a warning call. I could not decide upon any meaning for his soft, bow-string note, but it was very musical and quite unlike anything that would be expected from a Nighthawk. The repetition of the courtship flight and song of the male to the female, when both old and young were flying together high in air, was surprising and interesting. His singing had stopped almost altogether after the eggs were laid, and during courtship I never saw the song flight when the female was in the air. The young at first have a faint chicken-like "peep," but discontinue it at a very early age and are very quiet.

I believe the food given the young must consist of soft insects, for the most part, as a careful examination of a large number of droppings revealed no signs of hard wing-cases or beetles. Neither were there any bits of clam shell, so it is possible that clam shell may be given to make the young disgorge the pieces of beetle found with it in the pellet.

The Woodstock, Tacoma, Wash.

THE HISTORY AND PURPOSES OF BIRD BANDING.

BY FREDERICK C. LINCOLN

The entrance of the Bureau of Biological Survey, United States Department of Agriculture, into the field of bird banding will be viewed with interest by the students of this method of ornithological research. In the present paper the author endeavors to present a brief review of the subject from the historical aspect and to outline the problems that it is hoped will be solved by this method of investigation.

In studying the literature of earlier days, casual notes are found relative to the marking of a bird or brood for the elucidation of some pertinent question. This would indicate that the possibilities of such a means of study were not totally unappreciated by the early naturalists but the methods that they employed were too crude to produce important results. Flight or tail feathers were marked with indelible ink or paint; thin metal discs were glued to these feathers; parchment memoranda were tied to some part with silk thread; or the feet, bill or plumage were mutilated in a distinctive fashion.

Obviously none of these practices was satisfactory; and in many cases could, at best, last only until the succeeding molt. The general neglect of the tarsi for the attachment of identifying insignia seems particularly surprising today, since it is now readily apparent that no other part of the bird's body is so satisfactory to carry these marks. The first record of a bird marked on the tarsus that has come to my attention is that of a Great Gray Heron (*Ardea cinerea*) captured in Germany in 1710 carrying several metal rings, one of which (so the reference states) had been attached in Turkey several years previous. This record is interesting and it is regretted that full details are not available. Moreover, since this appears to be the first use of a metallic ring for this purpose, it would be a matter of considerable interest if the kind of metal were known. Nickel and aluminum were not extensively worked at that period and it therefore seems probable that silver was used, as neither iron nor brass would have lasted for "several years" on the foot of a bird that spent so much of its time in water. In subsequent investigations these two metals were used, with precisely the result that should have been expected, rust and corrosion to the total destruction of the bands.

In 1804, a Dutch naturalist, Brugmann by name, undertook to mark a number of White Storks (*Ciconia alba*) in an effort to learn whether they habitually returned to the place of their birth. His manner of marking is not known but as his birds returned (if they did) without the marks, nothing was gained. The only importance that can attach to this experiment is the fact that in the latter part of the same century the White Stork again figured in one of the most important of modern European investigations in bird migration.

Following this, a few sporadic attempts at bird banding were made by European investigators, but nothing of importance was done until 1899, when Herr Chr. C. Mortensen, of Viborg, Denmark, commenced to band and systematically to record Storks, Teals, Starlings and two or three birds of prey. Herr Mortensen may well be called the pioneer in scientific bird banding.

Stimulated by the success of the Danish ornithologist, bird banding in Europe came rapidly into prominence, so that by 1914 eighteen or twenty distinct projects were either in full operation or were about to be started. Few countries were without their representative schemes and but for the outbreak of international hostilities important results might have been achieved through the coordination of their activities. These were located and had their date of origin as follows: The German Ornithological Society's bird observatory at Rossitten on the Baltic, began banding operations in 1903 under the direction of Prof. Dr. J. Thienemann; and the Royal Hungarian Central Bureau for Ornithology started its work under the direction of Jacob Schenk at Budapest the same year. In 1904 the German Society established a second observatory at the naval base of Heligoland in charge of Herr Weigold. Prof. A. Landsborough Thomson began work in Scotland under the auspices of Aberdeen University in 1909, and the project of 'British Birds' magazine, under Mr. H. F. Witherby was inaugurated that year, as was also one in Russia under the direction of the Natural History Society, at Riga. Señor W. C. Tait at Oporto, Portugal, also commenced to band birds in 1909 but apparently did not press his work to any great extent.

In 1910 the Bavarian Ornithological Society and the Kroatian Natural History Society undertook banding work, and in 1911, Herr K. Daut, at Bern, Switzerland, and the Biological Society at Gothenburg, Sweden, started similar investigations. The latter of these was subsequently taken over by the Royal Natural History Museum, at Stockholm. In 1912 the Prussian forest officers were authorized by the Ministry of Agriculture, Lands, and Forests to band birds; and in 1913 Herr Tratz founded an ornithological station at Salzburg, where banding was carried on. The year 1914 seemed to dawn auspiciously for investigations of this character, as no less than four distinct projects were either

started or considered for future development. First the station of "Lotos" at Libock, in Bohemia, was founded; then the Leyden Museum took up the work in Holland under the guidance of Dr. Van Oort; the Imperial Russian Acclimitization Society for Plants and Animals founded an association at Moscow to mark birds; and Dr. Menegaux, of the French League for the Protection of Birds, outlined a plan for the consideration of that organization.

From the available figures these different organizations succeeded in banding approximately 170,000 birds. No complete records of the 'returns' received have been compiled but it would probably be about 3 or 4 per cent, or from 5,100 to 6,800 birds.

The history of bird banding activities in America is more or less known to the members of the A. O. U., because of the various papers on the subject that have appeared in 'The Auk.'[1] In these papers are mentioned the early experiments of Audubon, the work of Mr. P. A. Taverner, of Dr. John B. Watson, at Dry Tortugas, of the New Haven Bird Club, of Dr. Paul Bartsch, near Washington, D. C., and, in addition, several of the foreign projects outlined above.

As the immediate result of this pioneer work and through the efforts of Dr. Leon J. Cole, the American Bird Banding Association was formed in New York City, December 8, 1909, with a charter membership of over thirty.

This organization under the able guidance of its secretary, Mr. Howard H. Cleaves, continued to advance the work. From the fall of 1911 until early in 1920 it was conducted under the auspices of the Linnaean Society of New York, but in the latter year, having outgrown the available resources, it was formally taken over by the Bureau of Biological Survey of the U. S. Department of Agriculture.

Beginning in the year 1914 one of the most interesting chapters in the history of American bird banding activities was written

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[1] The more important of these are: "Suggestions for a Method of Studying the Migration of Birds." By Leon J. Cole, Third Ann. Rept. Mich. Acad. Sci., 1901, pp. 67-70. "The Tagging of Wild Birds as a Means of Studying their Movements." Leon J. Cole, Auk, XXVI, No. 2, April, 1909, pp. 137–143. "The Tagging of Wild Birds: Report of Progress in 1909." Leon J. Cole, Auk, XXVII, No. 2, April, 1910, pp. 153–168.

"What the American Bird-Banding Association has Accomplished During 1912." Howard H. Cleaves, Auk, XXX, No. 2, April, 1913, pp. 248–261.

by Mr. S. Prentiss Baldwin, of Cleveland, Ohio.[1] By means of traps of various types he conclusively demonstrated that through an efficient system of trapping a much larger percentage of "returns" might be secured than had been possible in the past when the killing of the bird had been depended upon for the recovery of the bands. Mr. Baldwin's experiments were carried out at his farm near Cleveland and at Thomasville, Georgia, and both of these stations are still in operation.

Turning now to a discussion of what may be learned through this method of investigation that is not possible by any other, we note at the outset that we are approaching the various questions from the aspect of the individual bird. We have each case complete in itself and by the coordination of many of these cases we can proceed to broader generalities. The 'return' record of a banded bird indicates that there were at least two times in its life when its whereabouts could be stated with precision. It therefore becomes axiomatic that the data secured from banded birds are incontrovertible. This evidence will bear on the problems both of migration and of life history.

Considering the former of these subjects and it will be noted that there is much mystery associated with the phenomenon of migration, which from the viewpoint of our present knowledge, can not be solved because of the lack of certain data.

To illustrate: The general speed at which a species advances or retreats during its periodic movements has been computed by means of the observations made by competent observers at different points along the route. But the exact number of miles that any one bird will travel in a day's journey, has not been ascertained, due, of course, to the impossibility of keeping the individual under observation. Moreover, it is not known whether any one flock or group of birds continually remains in the van, or whether the advance is made in a manner comparable to a game of leap-frog, successive groups 'jumping' over each other in alternate periods of rest and flight. The study of these so-called bird waves has attracted much attention in the past and their associ-

[1] Bird Banding by Means of Systematic Trapping, by S. Prentiss Baldwin, from abstract of Proceedings, Linnaean Society of New York, No. 31, 1919, pp. 23–56.

ation with meteorological conditions has been more or less generally accepted. Banding records should elucidate this question and show accurately just what this relationship really is.

Again, to what extent do the individuals of a species follow the same route of migration in successive years, and is it the same for both spring and fall journeys? The importance of this question will be evident when it is considered that in the case of migratory waterfowl, the open seasons for shooting are during the time the birds are either on their winter feeding grounds or en route thereto. Consequently, data of this character will have an important bearing upon the enactment of appropriate laws for their protection.

Among other unanswered questions bearing on the subject of migration is whether those members of a species that breed farthest north, winter farthest south; in other words, whether they 'jump over' those members that breed in the intermediate zone which latter either make a much shorter migration or do not migrate at all. An observer at one point sees a general southward movement in the fall, while another, situated several degrees nearer the equator, finds the species stationary or at least present every month of the year. But the latter observer is unable to be sure that he sees the same birds continually in his latitude, nor is there any way in which he can decide this except by marking them. It is a well-known fact that with several species the young migrate separately and at a different time from the adults. This being true, do they segregate themselves to the extent of occupying different winter quarters? At this season the plumage is not always a safe criterion of age, and even the age of the bony structures can be determined only by an experienced anatomist.

Consideration of this last question will at once bring to mind the unsolved problem as to how long the individuals of any species remain on their winter feeding-grounds or in their breeding area, or how much time is consumed in travel between these two points. Neither is it known whether the individuals of all species return with regularity to winter in the same area. All these questions may be answered through trapping operations, since the birds frequenting any station will be registering ('repeating') their presence almost daily, and the dates of arrival and departure may therefore be stated with exactitude.

Another question that still awaits a satisfactory answer is: To just what extent and in what species, if not in all, is there a return to the site or vicinity of the nest of the previous year? Popular belief and some observations credit birds with an affinity for the old nest, but while it must be admitted that the theory is not untenable, it is by no means completely proved. Furthermore, if this theory be accepted in its entirety, consistency would demand the additional belief in the permanency of matings. If this hypothesis be rejected while still retaining the former, we are immediately confronted with the query as to which one of the pair is drawn by the magnet of the last-year's nest-site.

And what is the reason the young birds do not return (if true) to the region of the parental nest? Is the mortality heaviest among these yearlings, are they engaged in colonizing new districts near by, or do they constitute the vanguard of their species in the gradual extension of their range? Certain it is, that under normal conditions the avian population of an area is practically stationary. It has been found by actual count over a period of years that the number of breeding pairs will vary but little. Therefore, what becomes of the numerous offspring? As a suggestion, it may be that they winter in a different area from the adults and in going northward the next spring they enter a region *at a considerable distance* from that of their birth. They may even enter the territory of a different variety of the same species, or, on the other hand, they may strictly observe the confines of their own race and return to breed in the general vicinity of their own parental nest. The data that solve this problem may therefore have an all-important bearing on the subject of evolution with particular reference to the development of geographic races. Such information should also throw light on the effect of winter as well as summer environment on plumage changes.

The second group of problems on which data will be secured through this method of investigation is concerned with life histories. It will be at once apparent that the life histories of banded birds will be unique since in each case the information will pertain to a particular individual or a particular family.

Probably one of the most interesting subjects under this heading is the aforementioned permanency of matings. Mr. S. Pren-

tiss Baldwin has already studied the marital relations of the House Wren as presented elsewhere in the present number of 'The Auk,' and his conclusions may or may not be found to apply to other species. This theory, together with the supposed affinity for the nest site of the previous year, has gained considerable credence in the public mind, and while confirmatory proof is not entirely lacking, a great quantity of corroborative evidence is still needed before it can be completely accepted. Evidence on this subject may easily be collected with regard to those species that have shown a preference for nest boxes, since the banding of the entire family is comparatively simple, the nest box being readily converted into a temporary trap. Both the parents and their brood should be banded, and this should be done when the young are so well grown that there will be no danger of the parents' deserting them.

Although the banding of nestlings should be practiced at every possible opportunity there are certain features of this phase of the work that make it a less efficient method of operation than the systematic trapping of adults. One of the greatest disadvantages of the former method, is the high mortality rate among young birds. Probably the most precarious time in a bird's life is the period immediately after it leaves the nest. It has been estimated that only about 50 per cent of the young hatched actually reach maturity. It is therefore apparent that if this be true, many bands are wasted, and in addition, the record files contain many original data from which there can be no hope of returns but which must nevertheless be retained. An obvious advantage, however, is the collection of specimens of known age that will eventually be secured and which will be of incalculable value in studying the sequence of plumages and as an aid in determining the longevity of the individual. In banding young birds due regard must be given to their age. Young recently hatched should not be banded except under very exceptional circumstances; rather, the operator should wait until they are practically ready to leave the nest. At this time their tarsi will, in most cases, be fully grown or even over-grown, so that no allowance need be made for future growth.

The distance that birds will range from their nests in foraging for food has never been determined, and it should be a matter of

considerable interest. These data might be obtained from two or more adjoining trapping stations, or from one station alone if the operator would endeavor to locate the nests of the birds that frequent his traps. This information would also show the number of feedings per day and the preference of both adults and young for certain kinds of food. During the winter months birds are generally considered as more or less stationary, and it would be interesting to learn just how far they will wander from a known source of food supply. Visual observations in this case would supplement the trap records. The time spent in various activities is another item of interest in the study of life history, and the operator of a trapping station will have special opportunities to acquire such information.

The establishment of trapping stations is comparatively simple. Throughout the country there are many persons who feed the birds during the entire year. It will be seen that each of these feeding stations may readily be transformed into a trapping station without in any way detracting from its value as a source of avian food supply. It has been the observation of the author that if carefully handled, birds are neither injured nor unduly alarmed by being trapped. It is true that they are likely to struggle in the hand and some firmness is necessary to prevent injury, but the fact that many banded birds not only return to the trap, but do so again and again, is sufficient evidence that the treatment they received did not give them the fright or injury that some fear will result from this work.

While on this subject, the merits of the question as to the relative harm done to bird life through such operations may well be discussed. Occasionally birds will be injured or even killed through accidents in the trap or through careless or inexperienced handling, but such occurrences are so rare that they may be totally ignored. A band properly placed causes neither harm nor discomfort to the wearer. The word 'properly' must be emphasized, for an improperly placed band may readily cause trouble. If placed too tightly it may stop the circulation in the foot and so bring about a condition of paralysis; if placed too loosely, it may become caught on thorns or twigs. (This latter is applicable only to very small birds.) But the careful operator will rapidly

acquire such skill in handling the birds and in placing the bands that the number of casualties will be negligible.

There is absolutely no danger of bird banding leading to promiscuous slaughter. This is obvious when it is considered that no matter how complete the system or how enthusiastic the operator, the actual percentage of banded birds to the entire avian population will always remain so small that shooting for the sole purpose of securing banded birds would be ridiculous. Even on ducks and other large birds for which comparatively large bands are necessary, the bands are too small to be distinctly seen at the usual distance of observation without the aid of excellent field glasses under the most favorable conditions.

Although the bands used are considered as permanent marks, the use of the term 'permanent' must be qualified, since the habits, size, and relative strength of the different species will have a very important effect on the permanency of any artificial mark. For example, the use of an aluminum band on river ducks that spend the most of their time in fresh water, may be considered practically permanent, but with the salt-water diving ducks, the case is different. Alkalis attack aluminum in a manner comparable to the action of acid upon iron or copper, and in consequence the endurance of aluminum bands carried by waterfowl will be in inverse ratio to the length of time the birds spend in salt water. As an instance of this character I may mention that I have examined several bands that had been carried by ducks of various species for three or four years. The bands on those birds that followed the Mississippi valley as a migration highway and that nested near or on fresh water showed but ordinary wear, while those carried by the ducks that frequent Great Salt Lake, for example, were eaten away to the point of total obliteration of number and legend. In addition, crows, jays, and some of the larger finches are almost certain to make every effort to remove the band, and the stiffness of the metal or the locking device must therefore be of such nature as to defy their strength and ingenuity.

Nevertheless, it may be assumed that for this purpose aluminum bands are practically permanent. Therefore, the subjects for serious consideration are the methods of securing the birds for banding and for the return of the bands. Heretofore, by far the

greater number of birds banded have been fledglings and the 'returns' have been obtained through the chance killing of the bird at a later period by some person with sufficient knowledge and interest to comprehend the meaning of the band and to forward it to the proper authorities. That this method has not been devoid of results, we know, but the percentage of 'returns' has been low, and furthermore, there are but two positive dates, that of banding and that of capture, which latter has almost invariably meant the death of the carrier. With some species, it is still believed that this procedure will have to suffice to a considerable extent, for in the case of migratory game birds there can be no question that many of our 'returns' will be sent in by sportsmen. But even with these more systematic methods are possible.

In conclusion it may be stated that a variety of methods must be employed for no one system will apply to all cases. For many of the ground-loving species the Government sparrow-trap, with slight modifications, has proved excellent. Other sparrow traps now on the market have not been extensively tried but probably many of them may be successfully used. The use of some device for throwing a net over a baited area, and thus catching an entire flock, should prove particularly satisfactory for those birds that have a distinct aversion to going under anything, such as shorebirds. For ducks and other waterfowl, still different schemes must be employed, but satisfactory traps are too well known to allow any doubt as to the success of the operator who works with these birds.

The use of the 'jack-light' has scarcely been tried in this country, but it might be a most successful method of operating in breeding colonies of Herons, Ibises, Gulls, Terns, Pelicans, and other birds with the communal habit.

With the element of anticipation always present, expecting and watching for a bird marked at some other station or during a previous year, it seems that this new system of bird banding should find a host of enthusiastic participants. The Biological Survey is prepared to assist in the construction of traps, with information about those that have been successfully operated, and will issue the bands and forms to be used in recording the data.

Special Federal permit for this work is required under the provisions of the Migratory-Bird Treaty Act. Application for permit and full information relative to the work may be secured by addressing the Bureau of Biological Survey, U. S. Department of Agriculture, Washington, D. C.

Biological Survey, Washington, D. C.

RECENT RETURNS FROM TRAPPING AND BANDING BIRDS

BY S. PRENTISS BALDWIN

1. OPERATIONS AT CLEVELAND, OHIO.

The methods used by the writer, for trapping and banding birds have been fully explained in an article published by the Linnaean Society of New York in 1919.[1] Briefly it may be explained that by means of the so-called Government sparrow-trap, and by the use of trap nest boxes, adult wild birds are caught, aluminum bands bearing address and numbers for identification are placed on the legs of these birds and they are then released. During the last six years many hundreds have been thus banded and many thousands handled by the writer; and many have been re-taken again and again the same season and succeeding seasons.

The publication above referred to contains, besides a description of methods, a report of the returns of birds to and including the year 1918. The following report includes only the "returns" of the years 1919 and 1920. Those who have a copy of the previous report may be interested to know that three of the birds described therein, were taken three years later, in 1920, and appear in this report. These are Brown Thrasher, number 19247; Red-bellied Woodpecker, number 31778; and White-throated Sparrow, number 38160. An additional report for House Wren number 44008 is also contained in the following pages.

Handling Wild Birds.—Two positions for holding birds are described and illustrated on page 27 of the 'Proceedings.' Per-

[1] Proceedings of the Linnaean Society of New York No. 31, 1919.

haps I should have described also the simple process of changing a bird from one position to the other without danger of flutter or escape; i. e., to pick the bird up by the head. It sounds barbarous and you expect the bird to hang himself, or pull his own head off, but it is really a very satisfactory method and does not harm the bird in any manner. One soon learns a knack of handling birds quietly, in banding, changing position, or examining, and indeed in a few moments the bird is so quieted that one may open the hand flat, and sometimes even roll the bird back and forth on the open palm without any attempt on its part to escape. Then suddenly it goes like a shot, so quickly that one cannot see how it is done.

I have not had such abundant returns at Cleveland as I find in the work in Georgia, In the latter region it is an intensive work, taking many birds in a short season of a month or six weeks, during the high point of spring migration, with a high percentage of returns. But in Cleveland I miss the spring migration, and get only the local residents during the summer and the fall migration of the various native sparrows.

Considering the larger percentage of returns in Georgia of Myrtle Warblers and Chipping Sparrows, some of them not only one year but two and even three year returns, the results in Ohio are astonishing for their meagerness. Autumn after autumn I have banded many migrant White-throated and White-crowned Sparrows, and have never had one back the next year. This does not mean that it is useless to band these sparrows, for the banding does give information of their movements from day to day and the dependence of those movements upon the weather.

To What Extent do Birds Return?—Of 156 House Wrens handled in five years 10 returned, or about six and two-thirds per cent. This figure may be considered fairly accurate though probably below the real number returned, as some no doubt escaped me. Of the total number of birds of all kinds banded at Cleveland, prior to 1920—some 1200, 36 have returned one or more years, or 3 per cent. This figure is of birds actually taken, but as many of the birds on my lists are species that do not come to the traps, and many others likely return and nest nearby, but are not taken in the traps during the season; the figure is much too low. Prob-

ably ten per cent may be about a correct estimate of those which survive and return to within 500 yards of last year's site.

The percentage of returns in Georgia seems to run higher than ten, and likely so since all are adult birds when banded.

There is no doubt that, on an average, as many birds of any species die each year, as are raised that year; but it seems probable that the death rate is higher among the young birds of the year, than among adults. This death rate must be considered in any estimates of the tendency of birds to return; and estimates of the *average* life of birds.

Do young birds return to the same spot?—They do, sometimes. I have had several examples, but especially Robin 32932 and House Wren 45325, both banded in the nest so that there was no question as to their youth.

Birds banded in 1919 and 1920.—Total birds banded since 1914, 1064; of which 156 were banded in 1919 and 376 in 1920.

Migration. During the autumn of 1919 illness prevented my observations. In 1920 the weather was mild and uniform during the entire months of September and October, with no sharp storms. The birds therefore drifted in and out, without the distinct wave movements seen in more stormy years. The White-crowned Sparrows exceeded the White-throated Sparrows in number this season, while unusually large flocks of Chipping and Field Sparrows were present in October.

Return of birds banded in previous years.—

32932. ROBIN (*Planesticus migratorius migratorius*).
1917. Banded May 15 in the nest.
1919. Taken March 19 in the greenhouse. A positive return of a young bird.

29863. CATBIRD (*Dumetella carolinensis*).
1916. Banded June 22, at station B.
1917. Taken June 21, at station A.
1919. Taken June 21, in the greenhouse.

45399. SONG SPARROW (*Melospiza melodia melodia*).
1919. Banded October 7, at station A.
1920. Taken June 4, 6, 7, 10 (twice), 15, 18, 27, 30, July 9, 13, August 1 (with young 46081 and 46082), 2, 4, and 5. Always at station A although stations B and C were only 100 yards away.

45359. SONG SPARROW (*Melospiza melodia melodia*).
1919. Banded July 18, at station A (marked "young").
1920. Taken July 31, at station A.

53035. BROWN THRASHER (*Toxostoma rufum*).
1919. Banded May 16, at station B. Taken June 7 (at A), and 11 (at B.).
1920. Taken June 15, at station B.

53038. BROWN THRASHER (*Toxostoma rufum*).
1919. Banded June 10, at station B. Taken June 21 and 29 and July 25. All at B. Accompanied, June 10 by young 53039 and on July 25 by young 53056 which would seem to have belonged to a second brood.
1920. Taken July 26, and July 22 (twice) always at station B. Accompanied July 26 by young 53928.

41273. BLUE JAY (*Cyanocitta cristata cristata*).
1919. Banded May 13 with 41272.
1920. Taken July 11, at station B, with 53926.

38643. CHIPPING SPARROW (*Spizella passerina passerina*).
1916. Banded September 12.
1920. Taken September 25, at station E. Had a swollen hind toe on right foot. Taken again October 7 (at E) and kept over night in a cage to show to Dr. Chapman and Mr. Fuertes who visited the place on October 8.

It had been four years since I had seen this little fellow. Coming at the same time in both the years that I caught him, and with flocks of others, I believe this bird was migrating and had just stopped en route.

Returns of House Wrens at Cleveland.—In the case of House Wrens I am able to band each year practically every individual, old and young, on the place, and can trap each year practically every adult so that a much more accurate and definite record of these birds can be secured that of those caught in the other bird traps which are dependent largely on chance. During the past two years I have been more careful of the Wren record than formerly, but even so, a few may have escaped me during my absence from the farm. The summary of Wren banding and examination for the several years is as follows; all "new" birds being banded each year.

1914. Banded 12 individuals. No returns from these.
1915. Banded 44 (5 adults and 39 young). One adult, 27739, was retaken in 1916. (see Linnaean Proceedings, p. 52).

1916. Examined only 7 (2 adults and 5 young). One adult was a 1915 bird as above stated. Had no time for the work this year.

1917. Examined 22 (6 adults and 16 young). One of the birds banded this year 44008, was retaken in both 1918 and 1919.

1918. Examined 27 (9 adults and 18 young). Four of the adults banded this year were retaken in 1919.

1919. Examined 44 (12 adults and 32 young). Four of the adults and 1 young banded this year were retaken in 1920.

1920. Examined 51 (13 adults and 38 young).

Summing up the results: Of the 156 individuals handled from 1914 to 1920 (not including 1920) ten have returned, nine of them being adults and one a young bird while one bird has appeared a third year.

Returns of House Wrens in 1919 and 1920.—

45206. HOUSE WREN (*Troglodytes aedon aedon*).
1918. Banded July 14 at Box 47.
1919. Taken June 17 at Box 26.

44008. HOUSE WREN (*Troglodytes aedon aedon*).
1917. Banded July 4 at Box 51.
1918. Taken at Box 51 June 19.
1919. Taken June 17 at Box 19.

44100. HOUSE WREN (*Troglodytes aedon aedon*).
1918. Banded June 19 at Box 51.
1919. Taken June 17 at Box 19.

44526. HOUSE WREN (*Troglodytes aedon aedon*).
1918. Banded June 23 at Box 40.
1919. Taken June 24 at Box 40.

45335. HOUSE WREN (*Troglodytes aedon aedon*).
1919. Banded June 24 at Box 63.
1920. Taken June 15 at Box 49 and July 7 at Box 63.

45303. HOUSE WREN (*Troglodytes aedon aedon*).
1919. Banded at Box 25 June 17.
1919. Taken July 20 at Box 53.
1920. Taken June 17 at Box 25 and July 29 at Box 25.

45342. HOUSE WREN (*Troglodytes aedon aedon*).
1919. Banded June 26 at Box 53.
1920. Taken June 17 and July 29 at Box 25.

45325. HOUSE WREN (*Troglodytes aedon aedon*).
1919. Banded June 19 as a young one in Box 3.
1920. Taken July 7 and 28 at Box 59.

45349. HOUSE WREN (*Troglodytes aedon aedon*).
1919. Banded July 4 at Box 53.
1919. Taken July 20 at Box 53.
1920. Taken July 13 at Box 47.

II. OPERATIONS AT THOMASVILLE, GEORGIA. 1920.

What old friends among the birds may one expect to meet after an absence of three years? How many have died? Is it not an axiom that in each species about as many die every year as are raised in that year? How many have strayed? How many still live in exactly the same old haunts or return to the same spots to spend the winter? These are some of the questions that bird banding may be able to answer and those who have read my previous account of bird banding at Thomasville, Georgia (Proc. Linnaean Society of New York, No. 31, for the year 1919) will understand the interest with which I returned to Thomasville in February, 1920 after an absence of three years.

In the three seasons previously spent here I banded 542 birds as follows:

1915.	Resident birds	27.	Migrants	63.	Total	90.
1916.	" "	44.	"	169.	"	213.
1917.	" "	24.	"	215.	"	239.
		95.		447.		542.

In 1920 11 of these birds were taken again in the traps, seven residents or more than seven percent and four migrants or nearly one per cent. In the five traps 723 individual birds were taken in 1920. Of these 283 were new birds and were banded this season while 440 captures represent recaptures of these same birds or of the eleven banded in previous years. Of the new birds 232 were migrants and 51 residents.

The migration began in earnest among the Myrtle Warblers and Chipping Sparrows in the second week of March, the movement being clearly shown in the number of birds handled in the five traps, only 86 being taken in February while 637 were taken in March. Mr. Frederick C. Lincoln in charge of the bird banding work of the U. S. Biological Survey, visited me in Thomasville, March 20 to 24 and during these five days we handled 222 birds among which were Blue Jay 31772 of 1916 and Myrtle Warbler

27440 of 1917. There was a joyous reunion when Brown Thrasher 19247 appeared. Although the early history of this bird has been given in the 'Linnaean Proceedings,' p. 35, it is desirable to republish its record in full, along with that of another 1917 bird retaken in 1920.

19247. BROWN THRASHER (*Toxostoma rufum*).
1915. Banded February 27 and taken again March 13. It was the mate of 19246 at station A and was always shy of the trap although 19246 always entered it.
1916. Taken March 4, 11, and 17. It was again the mate of 19246 and each bird had the same attitude toward entering the trap as last year.
1917. Taken March 11 with 31783 which was believed to be its mate this year. The former mate 19246 has not been taken since 1916. Taken again alone on March 12 and 13.
1920. Taken February 16, 20, March 8 (with 53085), and March 11. This year as before always at station A. May we not consider 53085 its mate for this year? 53085, by the way, has the left leg off at the mid-tarsus and well healed into a button. My conscience troubled me as I feared it might possibly have been the band that caused him the loss of his foot and that he might be the same mate as last year.

40796. BROWN THRASHER (*Toxostoma rufum*).
1917. Banded March 2. Taken March 8 with 31779 and alone on March 19 always at station D.
1920. Taken March 16, 20 and 21 (with 53092) always at station B, two-hundred yards from station D.

Brown Thrashers are classed as permanent residents, not meaning to imply that any one individual may not be a migrant, but they are mated and nesting in March so that it seems fair to assume that two caught together are mates. Other 1920 records follow.

1916. BLUE JAY (*Cyanocitta cristata cristata*).
1916. Banded March 28 at station A.
1920. Taken February 15 at station A.
[1921. As this paper goes through the press this bird was caught again, March 6 (Sta. AA). It is now at least six years old.]

31772. BLUE JAY (*Cyanocitta cristata cristata*).
1916. Banded February 27 at station C.
1920. Taken March 23 at station A.

41897. BLUE JAY (*Cyanocitta cristata cristata*).
1917. Banded March 12 at station B.
1920. Taken February 27 at station C and March 3 at station A.

Blue Jays are classed as permanent residents and these returns of three birds from a total of 21 banded in the three years, 1915–1917, bear out the belief that they remain closely at home.

31778. RED-BELLIED WOODPECKER (*Centurus carolinus*).
1916. Banded March 7. Taken March 11, 19, 21, 22, and 24 at stations A, B and C.
1917. Taken March 9 at station B and March 11 at station C.
1920. Taken February 16 at station B, 19 (at B), 23 (at A), and 25 (at B).
This bird is a good old standby already published in my original report, p. 40. These woodpeckers feed on the ground much as the Flickers do, which accounts no doubt for their coming to the bread and grain bait.

32197. CARDINAL (*Cardinalis cardinalis cardinalis*). Female.
1917. Banded March 20 at station C.
1920. Taken February 13 at station C.

An unusual number of Cardinals, both males and females appeared all through March and I banded 29 new ones, though I had banded only 36 all told in the three seasons, 1915 to 1917. Could they be migrants?

16246. HERMIT THRUSH (*Hylocichla guttata pallasi*).
1917. Banded February 28 at station AA.
1920. Taken February 23 at station AA.
It was rather a surprise to get a Hermit Thrush, as I had banded only four—three in 1917 and one in 1918. I suppose this bird was migrating.

27290. MYRTLE WARBLER (*Dendroica coronata*).
1917. Banded February 28 at station C.
1920. Taken March 7 at station C and March 11 at station D.
[1921. As the paper goes through the press this bird was caught again, March 1 (Sta. D) and March 3 (Sta. B). It is now at least five years old and has made four trips to the north since it was banded.]

27440. MYRTLE WARBLER (*Dendroica coronata*).
1917. Banded March 1 at station C. Taken March 2 (at C and D), 3 (at C and D), 4 (at C), 5 (at D), 7 (at D).
1920. Taken March 19 at station C, 22 (at D), 23 (at B). This bird happily remained over from the 19th to the 23rd to greet Mr. Lincoln.

The taking of the same Myrtle Warbler in your hand after an interval of three years during which time the tiny creature has made three long trips to the far north certainly arouses your sentiment. To be sure I have banded many of these birds, 64 in 1917, 55 in 1916 and 15 in 1915, and have had numerous returns after one year or even two years but to capture these two birds after so long an interval was very gratifying.

In former seasons Myrtle Warblers have apparently wintered at Thomasville, at least they have been very plentiful in February, and would be mostly gone further north before the Chipping Sparrows came up from farther south; the second week in March; but this year the Myrtle Warblers seemed to come at the same time as the Chipping Sparrows appearing in flocks about March 6.

38160. WHITE-THROATED SPARROW. (*Zonotrichia albicollis*).
1916. Banded March 5 at station A. Taken March 6, 7 and 16 at the same station.
1917. Taken March 7 and 19 at station A.
1920. Taken February 25 (at AA), 27, March 2, 3 and 6—all at station A and March 22 (at AA.)

The taking of this bird is of interest not only on account of the history of the individual but because in my opinion it identified this group of White-throats as the same group that has been found in the same patch of shrubbery at the end of the house, station A, ever since 1915. This year the group seemed smaller, apparently only half a dozen individuals, while previously there had always seemed to be two dozen or more. In 1915 I banded twelve of these, two were re-taken in 1916 and one other in 1917. In 1916 I banded six, and of these four were re-taken in 1917. In 1917 I banded eighteen. In 1920 I banded only six.

I believe this is one and the same group of these birds that I first found here in 1915, a continuous though ever changing group as some die, young birds are added, some in mating go outside the group, and others mating come into the group. During February and March they remain closely together, feeding now on one side of the house, now on the other side, but always to be found somewhere at Station A. I believe these birds travel not as single pairs of mates but as a group of relatives and neighbors, year by year, from the same spot in winter, to the same spot in

summer and return. I call attention to this as a "neighborhood group" not as a proposition proved, but to suggest it as probable, and something which may be proved by this method of study.

Chipping Sparrows (*Spizella passerina passerina*). After having Myrtle Warblers return after three years, I did hope for one or two Chipping Sparrows but did not get a single one though I had banded 266 of them in the three years, 1915 to 1917. Among the new Chipping Sparrows only eight of the 110 banded had swollen toes, but it is probably only by chance that this does not equal the ten per cent, found in former years. But why do Chipping Sparrows have so great a proportion of diseased toes, while the condition seems never to be found in other birds?

Individuality in Birds.—The behavior of the individual when handled is interesting. The Cardinal nearly always screams and squeals and fights with energy, yet four of the twenty-nine handled in 1920 are marked to have squealed very little. This is not an accident of the moment, for the same bird will act the same way every time it is handled. Myrtle Warbler (45490) taken six times squealed every time, though no other Myrtle Warbler of nearly 200 handled has squealed in my hands. Of the hundred or more Chipping Sparrows handled this year five only have squealed in handling.

Of about the 730 birds trapped in February and March only six were killed, and these by shrikes or hawks, but many more would have been destroyed if we had not watched the neighborhood with a gun.

2930 Prospect Ave., Cleveland, Ohio.

THE MARRIAGE RELATIONS OF THE HOUSE WREN (TROGLODYTES A. AEDON).

BY S. PRENTISS BALDWIN

INTRODUCTION.

The belief that most birds mate for life and each year return to the site of the previous nest to rear their young, is very old, and in the popular mind it is probably more or less generally accepted. The following data will have a bearing on this matter

and will also throw additional light on the interesting subject of incubation periods.

It was in the spring of 1915 that I began the use of trap nest boxes and numbered bands for the house wrens on my farm near Cleveland, Ohio, and made the interesting discovery of my first 'wren divorce.'[1] This pair, having successfully raised one brood together, separated, and each secured a new mate for the second brood of the same season. The question that was immediately presented by this action was: is this exceptional or is it a matter of regular occurrence with this species?

Since then I have used increasing care to take the adults of each season and to band both them and their young, with the result that my suggested need of a geneological tree, seems warranted. When it is realized that in one case, I have an accurate record from the original parent stock to the third generation in direct line, with numerous uncles, aunts, cousins, brothers and sisters, it is apparent that the services of a trained genealogist may be needed to continue the record.

In trapping the occupants of my nest boxes, I have found it advisable to wait until the adults are actively engaged in bringing food to the young. There is then no question as to the mates for the nest under observation and there is less danger of the birds deserting. I have at times trapped one or both adults before the eggs were hatched or even laid, but they will almost invariably abandon the nest if interfered with at that time. I have also found it advisable to carry an account with the nest boxes since the resulting data provide interesting information relative to incubation periods and time from hatching to flight, as well as the choice of the birds for the different locations of the nest boxes.

In the paper previously referred to, I gave a summary of the first "wren divorce case" that came to my attention. In the following paragraphs this case is reviewed in addition to the family histories of four additional cases that I have studied. Although the term "divorce" may not be just the technical word that fits the case, their apparent love of change in marriage relations seems to fully justify its use. It has been suggested that poly-

[1] 'Bird-Banding by Means of Systematic Trapping' S Prentiss Baldwin, Abstract Proc. Linn. Soc. of N. Y., No. 31, 1919, p. 49.

gamy may enter into the consideration and that two families may be raised at once, but if this is ever true, there has been no evidence of it among the wrens that have been under my observation.

THE "A" GROUP.

My first case was provided by the pair of wrens that carried bands numbered 27739 and 27740 and reared their brood in box No. 9 on the greenhouse. These birds were banded on June 19, 1915 and after the young had flown I was absent from the farm for about six weeks. Upon my return on August 15, I was surprised to find another brood in this same box ready to fly. When the adults were trapped I was further surprised to find that while one parent was No. 27740, the other was unbanded. I gave this new mate band No. 27782 presuming at the time that No. 27739 had met with an accident.

But upon making the rounds of the other boxes I discovered that instead of being a casualty, this bird was the proud father (or mother) of another brood by another mate in a box only 100 feet distant on the pumphouse. I was unable to capture this mate but it was not a banded bird. Here was a clear case of divorce both birds remating with new mates and raising second broods the same season.

Number 27740 has not been heard from since, but the following year (June 23, 1916) No. 27739 was back in the box on the pumphouse where its second brood of 1915 had been raised. This year I succeeded in trapping the mate, banding it as No. 38491, but I do not, of course, know whether or not this was the second mate of 1915.

THE "B" GROUP.

On July 4, 1917, box No. 51, in the east garden was occupied by Nos. 44008, 44009 and their brood. Neither of these birds raised a second brood during that season (at least they did not occupy any of my boxes) but on June 19, 1918, No. 44008 was back at the same box, with a different mate No. 44100. The next year (June 17, 1919) box No. 19 on the greenhouse was occupied by these two, this being my first record of a pair of wrens that have either remained mated or have returned and remated after one season. This box is located about 200 feet from No. 51

where the 1917 and 1918 broods were raised. The broods of 1918 and 1919 were therefore full blood brothers and sisters although only step-brothers and sisters to the brood of 1917. No record of any of this family in 1920.

THE "C" GROUP.

Box No. 25 on the laundry was occupied June 17, 1919, by numbers 45302 and 45303. The brood was raised and No. 45302 then disappeared, but its mate, No. 45303, mated again and on July 10 was busily engaged in the rearing of a second brood in box No. 53, on the library, with a mate that was numbered 45349. For No. 45303 we thus have for this season a second mate and a second brood in a different box.

In 1920 (June 17) 45303 again returned and again started nest-building in box No. 25 on the laundry where the first brood of 1919 was raised. The mate this year was No. 45342, which had a curious history with 45335 and 45349 in 1919. He, 45342, had settled alone in box No. 53 on the library, on June 26, 1919, where he sang and carried on nest building by himself until driven out by 45349 and 45335. On July 29, 1920, this pair (45303 and 45342) were raising their second brood for the season, in the same box. The total record for No. 45303 is therefore; four broods in two years, or 27 young; with three mates. Three of the broods were raised in the same box. It should be further noted that in 1920 there was no divorce, as both broods were by the same mates, and in the same box.

Going back now to No. 45349, the second mate of 45303, and we have a little of his earlier history. He was taken on July 4, 1919 in box 53 on the library with 45335. These two were seen together just this one day but they seemed to be busily engaged in nest building. Number 45335 had been mated with No. 45334 in box 63 on the woodshed and their brood had only left the nest two days previous. This was apparently, only a flirtation however, as 45349 finally mated with 45303 (as above) in this box and raised a brood of seven youngsters.

In 1920, No. 45349, the second mate of 45303 in 1919, selected a new mate, No. 46006 and proceeded to nest in box No. 47 on the garage. Thus 45349 and 45303, who were mates for the second brood of 1919, both appear in 1920 with new mates.

THE "D" GROUP.

This family history started on July 14, 1918 when I banded numbers 45205 and 45206 at their nest in box No. 47 on the garage. The brood was not banded. Nothing more from this pair during 1918 and 45205 drops entirely from sight, but in 1919 (June 17) I found that 45206 had returned with a new mate, given band 45311, and was nesting in box No. 26 in the sugar house. After this brood had flown 45311 took a second partner No. 45324, and proceeded to nest in box No. 6 on the upper barn. This was on August 5, and as this second mate of 45311 was banded, I referred to my records to learn that it had already raised one brood that year (banded June 19) with No. 45332 in box No. 3 on the farmhouse.

This latter case (45324 and 45332) was the start of an interesting geneological tree. They were banded in box No. 3 on June 19, 1919, their brood receiving numbers 45325 to 45331. On June 22, 1920, I took and banded (No. 45968) a bird in box 53 on the library, where it had evidently been nest building alone, singing constantly. On July 5 a mate appeared which I captured on the 7th and my delight may be imagined when I found it was No. 45325, one of the 1919 brood of 45324 and 45332 raised in box No. 3 on the farmhouse.

These birds now moved around to the other side of the house to box No. 59, probably because I caught and handled them at No. 53 before the home ties were cemented by eggs and young. On July 27 their young were hatched and were later given bands No. 46074 to 46079. These young were therefore the grandchildren of numbers 45324 and 45332.

THE "E" GROUP

In the case of numbers 45334 and 45335, that started my record of the "E" family, there were strong indications of a serious flirtation as well as some unquestioned divorces. This pair nested in box No. 63 on the Woodshed and were banded together with their brood, on June 25, 1919. On July 4, just two days after their young had flown, No. 45335 was taken with No. 45349 in box No. 43 on the library (See "C" Family) where, after routing out No. 45342, who had been in solitary possession, they

engaged in active nest building for a day or two. The nest was then abandoned and it may be that 45335 returned to his former mate, No. 45334 in box No. 30 on the ice-house. This latter bird, with its mate, raised a second brood, the first having been in No. 63. I regret that I was unable to capture the mate, since if it was No. 45335, it would prove the suggestion of a flirtation.

Number 45335 returned in 1920 with a new mate, given number 45955, and a brood was raised in box No. 49 in the garden and banded on June 15. Following this they were divorced and with new mates they both proceeded to the raising of their second broods. Number 45335 mated with 45988 (new) and raised a second brood in box No. 63 on the woodshed, while No. 45955 mated with No. 46032 (also new) and nested in box No. 37 on the cottage. Thus after the divorce, both of the original pair secured new mates and raised second broods in the same season. Number 45335 has made a record of four broods in two seasons with at least three and possibly four mates, i. e. in case the first year's affair was only a flirtation. The second year it was a clear divorce.

It is interesting to note that in many cases, the second mates have been 'new' birds, i. e. they had not been recorded from my territory before, which would indicate that there must be considerable trading back and forth between different areas. In some other region, possibly close by my farm, there may have been several of my banded birds raising broods with mates that later moved over to my district and remated for the second brood. Such a theory could probably be proved if a well coordinated system were established. This might also explain what has become of the large number of young that I have banded, for, it will be seen from the foregoing account, only one of the young raised in my boxes has returned to nest in a succeeding season.

The successive matings of the birds in these five groups may be tabulated as follows in order to give a clearer idea of their complicated relationships. The first and second broods in each year are denoted by "a" and "b" after the year, while the "×" between two numbers indicates that the two birds represented by those numbers were paired. The device in Group "D" denotes that 45325 was the offspring of the 1919 pair with which it is connected.

GROUP A.

1915a.		27739 × 27740	
1915b.	00000 × 27739	27740 × 27782	
1916.	38491 × 27739		

GROUP B.

1917.		44008 × 44009	
1918.	44100 × 44008		
1919.	44100 × 44008		

GROUP C.

1919a.		45303 × 45302	
1919b.		45349* × 45303	
1920a.	46006 × 45349	45303 × 45342	
1920b.		45303 × 45342	

GROUP D.

1918.	45205 × 45206		
1919a.		45206 × 45311	45324 × 45332
1919b.		45311 × 45324	|
1920.			45325 × 45968

GROUP E.

1919a.		45334 × 45335	
1919b.		45334 × 45335*(?)	
1920a.		45335 × 45955	
1920b.	45988 —— × ——	45335	45955 × 46032

In keeping an account with each nest box, I have also secured some interesting information relative to the incubation periods, length of time from hatching to flight, and various idiosyncrasies of these birds. For the sake of those who are interested in such data this is presented in the following table. I regret that it is not complete for all cases.

BOX NUMBER	NEST STARTED	NEST COMPLETED	SET COMPLETED	EGGS HATCH	YOUNG LEAVE
6	—	—	July 4 (5)	July 13	July 28
23	July 4	No progress by July 23 and the nest removed.†			
25	July 4	July 6	July 13	July 26	Aug. 10
37	—	—	July 6 (6)	July 20	—
47	—	—	July 7	July 19	—
59	July 4	—	July 15 (6)	July 27	Aug. 12
63	—	—	—	July 3	July 20

* Just prior to pairing with 45303, 45349 was nest building for one day with 45335, but both abandoned the partnership. It is thought that the latter mated again with 45334 but this is not proven.

† This box is near No. 25 and the nest was apparently built by the occupants of No. 25 as a diversion, or in the same manner that marsh wrens build their dummy nests. The building instinct seems to need exercise in some cases, while the mate is incubating.

From the above data, I conclude that the incubation period is usually about 13 or 14 days and the period from hatching to leaving the nest, not less than two weeks, generally longer.

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THE ENGLISH SPARROW (PASSER DOMESTICUS) AND THE MOTOR VEHICLE.

BY W. H. BERGTOLD.

The writer does not hesitate to express and record his conviction that there has been a very notable decrease in the number of English Sparrows in Denver, during the past few years; this decrease amounts, almost, to disappearance within the business area. It is now, unfortunately, impossible to fix the exact beginning of this decrease, but the writer feels safe in saying that it has been going on for at least three or four years.

It will be of interest, and of some importance to analyze the conditions which, probably, have been, and are, bringing about a much-to-be desired diminution in the numbers of this exotic bird.

Fifteen years ago one could see on any of the crowded business streets of Denver, dozens, nay, hundreds of English Sparrows, and the air was then resonant with their shrill notes of love, war and alarm; during the past few months the writer has taken special notice of the abundance of this sparrow in the down-town districts, often making special excursions through various streets for the express purpose of estimating such abundance. It is the plain truth when the statement is made that not even a single sparrow has been seen on the business streets during any of the walks; the writer frequently walks from his office to various places of business, a mile or more, and does not *hear* any English Sparrows, much less see them. If this change be pointed out to the average citizen, he suddenly awakens to its truth and asks "why?"

There is a well grassed and timbered area surrounding the Court House opposite the writer's office and fifteen years ago both its trees and lawn were simply alive with English Sparrows, and their dis-

cordant cries made a din too well known to need describing anew. The trees also served as night roosting places for these sparrow hordes, a fact plainly evidenced by the filthy and heavily chalked condition of the underlying sidewalks. It seems to the writer that a conservative estimate of the sparrow population of this area as the conditions were at the time, could not have been less than one thousand birds; a recent careful daily examination of this locality, especially during the past few weeks reveals a remarkable, and at the same time, a most gratifying change.

The following quotations from the writer's notes are far more impressive than any detailed description would be, which he might attempt to write.

"Oct. 10., 1919—11.30 A. M., Bright warm day—Saw five sparrows only, about Court House, and heard five others. There are only two or three small chalked areas on the sidewalks.

Oct. 11, 1919—Warm clear day; saw six sparrows on Court House premises, all were eating of the seeds of "wire grass" growing in the lawn; heard three others in the trees and saw two on adjacent buildings.

Oct. 13, 1919—Bright warm day, 10 A. M., nineteen sparrows seen on or about Court House but some of these may have been "repeats."

Oct. 15, 1919, 4.30 P. M.—Cold and cloudy. Saw two sparrows, and heard three others about Court House. House Finches singing merrily.

Oct. 21, 1919, 11.30 A. M.—Cold and cloudy; three sparrows seen on Court House grounds.

Oct. 22, 1919, 10 A. M.—Mild and clear; nine sparrows seen and five heard about Court House square.

Oct. 24, 1919, 9.30 A. M.—Cold and misty—Saw ten and heard two sparrows about Court House.

These notes show that there has been a remarkable diminution in the numbers of English Sparrows about this locality, and the same condition of decrease can be said to obtain in the residential districts but to a lesser degree.

It has been shown (Auk Vol. XXX p. 70) that the English Sparrow was responsible for the destruction of 16% of the nestling House Finches hatched in nesting boxes provided for that purpose by the writer; during the past three years the writer's boxes for nesting finches have been disturbed very little by English Sparrows, only one of a considerable number of broods having been destroyed by this sparrow. In previous years the writer spent a good deal of his spare time, when at home, in protecting his House

Finches from the ravages of the English Sparrow, but it has not been at all necessary during the past three years. This relief from sparrow depredations, it would seem, has not been due to increased protection, but rather to the absence of sparrows; the fact is there have been fewer sparrows to harass the finches. It was the small loss of nests, eggs and nestling House Finches, through sparrow depredations, which focused the writer's attention on the decrease of this species, and lead him to make extended observations on pertinent conditions and facts.

The writer does not wish to be understood as stating that the English Sparrow pest had ceased in Denver; far from it, but that there is a marked decrease seems beyond cavil and that this decrease is still going on, probably at an accelerating pace, is almost a demonstrated fact to the writer.

To what can this changed condition be attributed? Increase of enemies, mortality by disease, changing environment, or lessening of food supply, all of these, and perhaps more, might be cited as possible causes. So far as the writer can determine (or learn) there has been no increase of any natural enemy of this sparrow, nor are there any indications of a wide spread decimating disease infecting and killing off this species; there is also little or no appreciable change in the sparrow's local environment, for there has been very little disturbance of shade trees, or loss of lawn areas in the areas wherein there has been the most noticeable diminution of sparrow numbers, and there are as many, or more, favorable nesting sites as ever. There has been, however, an enormous loss of food, a factor admittedly repressing a given species as much, if not more, than any other single condition. The loss of food comes about through an unexpected reaction following the appearance of new manifestations of civilization.

With this in view a glance at the horse population of the city of Denver is at once interesting and illuminating—the officials of the Denver Union Water Co., kindly supplied the writer with data which gave an approximate idea of the number of horses in Denver during several different past years. From these data we find that the number of horses in Denver in 1897 was 2601, in 1907, 5904, and in 1917, 3832. There were probably quite a good many in excess of these figures each year, but the figures

just given show the minimum number of horses that were supplied with water by the Water Company. These data show that there was a decrease of 33% in the number of horses in Denver between 1907 and 1917, notwithstanding that the human population had grown steadily and that the number of houses had multiplied extensively. This steady increase of human population, and the increase of houses obviously made for more garbage, etc., which however is only sparingly utilized by the English Sparrow, if it can get grain, etc. It is, however, not on this source of food that this species lives in the urban districts. The writer is thoroughly convinced that this species lives, especially in the downtown districts, almost exclusively on horse manure. To test the above mentioned data on horses, a rough check on the equine population in Denver was undertaken last summer, through the making of a count of the horses seen on the streets, while the writer drove about in various parts of the city. Inasmuch as most of such driving is done in the residential portions of the city, many drives were directed through the business sections, particularly in the wholesale districts, where the harnessed horse is still much in evidence.

It is highly probable that data gathered in this way include many "repeats," an error which would, in effect, strengthen conclusions as to a diminishing horse population. The highest number of harnessed horses seen on any single day on the streets of Denver was 140, and the lowest was 11 (no counts having been made on Sundays or holidays), the average of fifteen days in July having been 70. While the writer has no earlier collected data to submit in parallel with these just given it seems self-evident that this average of 70 horses per day is a striking decrease from the average which probably obtained five years ago. Unless the writer's recollections are unreliable and hazy, it would seem to him that ten years ago two or three times that number of horses would have come under observation during the same period of time. There can be, however, little question concerning the reality of the "vanishing horse," for it has been shown (Saturday Evening Post, Sept. 13, 1919) that the number of horses in New York City recently declined from 108,036 to 75,740, and it is probable that what amounts to decrease (by displacement or

substitution) has occurred also in suburban areas, since statistics seem to show a decrease or displacement of 33% of the horses in one of the Dakotas. Finally in this connection it can be said that early in November 1919 there were enough tractors in use in Colorado to displace 16,000 horses, which shows that conditions reported in New York City and in Dakota also obtain in the state of Colorado.

One can ascertain approximately how much difference the smaller horse population has made in the amount of refuse removed from the streets of Denver, through the Street Cleaning Department records. Officials of this Department have kindly furnished some interesting facts shedding light on this question of street sweepings, etc.

A record of the cubic yards of street sweepings, and the number of blocks whence such sweepings are derived, is kept by this Department of civic activities; before and up to 1911 only the undivided total sweeping yardage was recorded, but in recent years the yardage gathered by the sweeping machines, and by the "push cart brigade" has been differentiated and separately recorded. A tabulation of the machine sweepings shows that in 1911, 38,000 cubic yards, in 1914, 30,000 cubic yards, and in 1919, 13,000 cubic yards were collected, the figures for 1914 and 1919 being estimated for the whole year from the September sweepings of the respective years, September having been chosen because it is one of the driest months, and hence there is then little or no natural cleaning of the streets by rain. These data, just given, are based on the assumption that the surface blockage remained stationary from 1911 to 1919, which is far from being the case. Notwithstanding a definite increase of surface to be cleaned each year, the yardage of sweepings steadily diminished in place of increasing as it would have done, all other things having been equal. In terms of cubic yards per block the machine sweepings are as follows: 1911—0.38 cubic yards, in 1914—0.31 cubic yards, and in 1919—0.13 cubic yards. It needs no great effort of the imagination to picture to oneself, the vast difference this steady and great decrease of surface refuse has made in the food supply of the English Sparrow. The push cart sweepings were and are practically all horse droppings, and were and are

gathered almost entirely in the business districts. Of the *combined* yardage of machine and push cart sweepings in 1914 and 1919, about 30% is charged against the push carts. Assuming this ratio to have held true in 1911 (in truth probably a low estimate), calculating the push cart sweepings for 1911 from its total sweepings by this ratio, and tabulating all three years, it appears that in 1911 there were 1.61 cubic yards, push cart sweepings per block, in 1914 there were 0.96 cubic yards per block, and in 1919 there were 0.71 cubic yards per block. These data mean that there was a diminution of 56% in the amount of horse droppings from 1911 to 1919. Expressed in actual cubic yardage of sweepings, they mean that from the same number of blocks swept by push cart men in 1911, 1260 cubic yards, in 1914, 1003 cubic yards and in 1919, only 474 cubic yards were gathered, all of which indicates that nearly 786 cubic yards of clear horse manure have thereby been gradually substracted from the daily, food supply of the English Sparrows inhabiting those areas. These data are more or less official and are at least approximately correct and accurate, and illustrate in a convincing manner, the truth of the belief that there has been wrought a great change in the urban sparrow's food supply during the past ten years. It would thus appear that there is ample cause alone, in the great diminution of the food supply, to explain the notable decrease of English Sparrows in Denver.

Obviously there is but one cause to which one can attribute the great shrinkage in the equine population of this city, namely the displacement of the harnessed horse by the motor vehicle; it is something unexpected to realize that an advance of civilization can bring about a beneficial change in the biology of a large city. While it has been almost unnoticed, it has been none the less certain and effective; the self-propelled vehicles of a city affect the sparrow not only through starvation, but probably also through making the species's street life so hazardous and fatal as to drive it largely out of the business areas.

It would be of interest to know if like conditions prevail in other large cities of this country.

Since this was written, November, 1919, there appears, to the writer, to have been a steady diminution of English Sparrows in

Denver, though at a slackened rate. The horse population of Denver as last reported, February, 1921, was 347, and that the displacement of horses in this and other urban areas is still going on, probably at an accelerated rate, seems indisputable. It was reported in March, 1921, in the public press, that motor trucks had increased in New York City to 68,000, an increase bringing about an acutal, and a potential, displacement of hundreds, if not thousands, of horses; in fact the ton capacity of these 68,000 trucks, it is said, would employ 1,260,000 horses. The facts herein reported seem of especial importance to our western states, notably California, and it appears to the writer that in these states persistent and thorough attention to suppressing or removing adventitious food supplies of the English Sparrow will give gratifying results in preventing the establishment, and the spread and increase of this pest.

Conclusions:

1—That there are fewer English sparrows in Denver than ten years ago.

2—That there has been a notable decrease in the horse population of Denver during the past five years.

3—That there has been a very patent diminution in the amount of sweepings gathered from the streets of Denver during the past decade.

4—That the reduction in street sweepings has resulted in diminishing Denver's English Sparrow population by starvation.

5—That all of the above results hinge on the introduction, and multiplied uses, of the motor vehicle.

1159 Race St., Denver, Colo.

A LIST OF THE BIRDS OF ROYAL PALM HAMMOCK, FLORIDA.

BY ARTHUR H. HOWELL.

Royal Palm Hammock—known also as Paradise Key—is an island or 'Key' situated on the eastern edge of the Everglades in southern Dade County, about 11 miles southwest of Homestead.

This hammock, containing about 400 acres, largely covered with a dense tropical jungle, together with a considerable tract of the surrounding Everglades, has been set aside recently as a reservation under the name of the "Royal Palm State Park," and given into the custody of the Florida Federation of Women's Clubs.[1] The Federation has built a roomy and comfortable lodge in the Hammock and a warden is stationed there. A good rock road leads to the Hammock and in a short time is expected to be continued to Cape Sable. Numerous trails have been cut through the jungle and many of the more interesting trees have been provided with labels giving their common and scientific names. It is now easily possible, therefore, for anyone to visit this unique and attractive spot and to study under especially favorable conditions its fauna and flora.

The Hammock has received considerable attention from botanists, particularly Dr. John K. Small, who has made many trips to the region and has published an extended description of its history and principal botanical features.[2] More recently Mr. W. E. Safford, of the U. S. Department of Agriculture, has published an interesting account of the natural history of the Hammock, in which four pages are devoted to a cursory account of some of the birds occurring in the region.[3]

According to Dr. Small 162 native species of flowering plant and 13 species of ferns are known from the Hammock. The list of trees numbers 46 species. The flora is almost wholly tropical in its affinities, most of the trees and shrubs being unknown in the United States outside of the Florida Keys and the Everglade Keys. The most striking feature of the Hammock vegetation—that which makes it unique—is the presence of upwards of a hundred tall and graceful royal palms (*Roystonea regia*) which tower far above the rest of the forest, reaching, it is said, 100 to 120 feet in height.

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[1] For a full account of the history of the Park consult an article by Mrs. W. S. Jennings, in The Tropic Magazine, Vol. IV, No 1, April, 1916.

[2] Small, John K., Journ. New York Bot. Garden, Vol. 17, Oct., 1916, pp. 165–172.

[3] Safford, W. E., Natural History of Paradise Key and the Nearby Everglades of Florida: Smithsonian Rept. for 1917 (1919), pp. 419–423.

Considering the richness of the flora in the subtropical jungle of the Hammock, the bird fauna is surprisingly meagre. Of the breeding species, only three can be said to be abundant, these being the Florida Cardinal, the Florida Wren, and the Key West Vireo. Occurring less commonly in the forest are the Chuck-will's-widow, Yellow-billed Cuckoo, Summer Tanager, Florida Crow, and Southern Pileated Woodpecker. It will be seen from this list that in spite of the distinctly Tropical character of the flora no birds of Tropical affinities are found in the Hammock.

In the pine lands on Long Pine Key and on the mainland east of the Hammock, Pine Warblers, Red-bellied and Red-cockaded Woodpeckers, Crested Flycatchers, and Bluebirds are the most numerous resident species.

In winter, also, the bird life of the Hammock is not nearly so abundant as in northern Florida, but in the migrations this region is visited by a considerable number of species, some of which at certain times occur abundantly.

The land birds of southern Florida have received comparatively little attention from naturalists. The southern limits of both the breeding and winter ranges of even the commonest species are not well known, almost nothing has been recorded concerning their migrations, and very few specimens have been collected.

The present list, therefore, while of a preliminary nature and doubtless far from complete, is presented as a résumé of our present knowledge and a basis for future investigations. Royal Palm Hammock apparently serves as a convenient way station at irregular intervals for a considerable number of migratory species on their journeys to and from the West Indies or South America, and continuous observation covering a period of years will be necessary before even a measurably complete list of the birds can be prepared. It is hoped that the warden of the Park will be encouraged to keep as full notes as possible of the birds visiting the Hammock and in the case of certain rare or obscurely marked species, he be permitted to collect specimens to verify his observations.

The list presented herewith gives the results of two collecting trips to the Hammock by the writer, in the interests of the U. S. Biological Survey, covering the periods from January 15–Febru-

ary 5 and June 11–19, 1918, together with notes made on numerous trips to the Park by Mrs. Hiram Byrd, and the observations of the Park Warden, Mr. Charles A. Mosier. Notes made in the Park by Dr. Henry C. Burgess, of Canandaigua, N. Y., December 26–28, 1917, and by Dr. Alexander Wetmore, February 20–28, 1919, are also included. My thanks are gratefully extended to the persons mentioned for their valued assistance.

I am likewise greatly indebted to the officers of the Florida Federation of Women's Clubs for permission to collect a limited number of specimens in the Park and for other courtesies freely extended.

Podilymbus podiceps. PIED-BILLED GREBE.—Winter resident; not common; seen frequently in Taylor River slough in December and January.

Anhinga anhinga. WATER TURKEY; "SNAKE-BIRD."—Common winter resident; less numerous in summer; seen in Taylor River slough, October 12, 1917 (Mrs. Byrd), December 27, 1917 (H. C. Burgess), January, 1918, and June 12, 1918.

Phalacrocorax auritus floridanus. FLORIDA CORMORANT.—Rare winter visitant; one specimen taken, January 21, 1918, as it flew over Taylor River slough.

Pelecanus occidentalis occidentalis. BROWN PELICAN.—A lone Pelican appeared on January 26, 1918, in a ditch along the road crossing the glade to the eastward of the Hammock; it was very tame, remaining unalarmed as automobiles passed within a few feet; the bird remained in the vicinity during most of two days.

Fregata magnificens rothschildi.[1] MAN-O-WAR BIRD.—Irregular visitor; Mr. Mosier has frequently seen single individuals soaring over the Hammock.

Anas platyrhynchos. MALLARD.—Rare migrant; Mosier reports a pair or two seen nearly every spring and fall.

Anas fulvigula fulvigula. FLORIDA DUCK.—Occasional, both in winter and summer; may breed. Noted by Mrs. Byrd, November 11 and December 24, 1917; a pair seen, June 12, 1918, by D. J. Nicholson, flying up Taylor River slough; small flock seen June 18, 1918, by workmen in the canal south of the Hammock.

Querquedula discors. BLUE-WINGED TEAL. Reported by Dr. H. C. Burgess, December 26–28, 1917.

Aristonetta valisineria.[2] CANVASBACK.—Mr. Mosier reports a pair seen about the last of December, 1917, in the glade east of the Hammock.

Guara alba. WHITE IBIS.—Common winter resident; less numerous in summer. Seen by Mrs. Byrd on October 12, November 4, December

[1] *Fregata aquila* of the A. O. U. Check-List.
[2] *Marila valisineria* of the A. O. U. Check-List.

23, 1917; flock of about 100 seen by the writer, January 15, 1918 and smaller flocks January 24 and June 12, 1918; Wetmore saw about a dozen, February 21–27, 1919.

Mycteria americana. WOOD IBIS.—Occasional winter visitant; single birds seen January 26, 28, and February 3; bunch of three on January 29, 1918; one seen by Wetmore, February 22, 1919.

Botaurus lentiginosus. AMERICAN BITTERN.—Regular winter resident in sloughs and ponds; noted by Mrs. Byrd, March 4, October 13, December 23, 1917; one or two seen almost daily from January 15 to February 4, 1918. Mr. Mosier found a nest of the Bittern in the Park in 1917; the bird was seen on the nest at close range.

Ardea occidentalis. GREAT WHITE HERON.—Rare or casual resident; a pair nested in March, 1916, in a pond apple tree near the head of Taylor River slough; one young was raised and the family remained in the vicinity till the summer of 1917. One adult individual was observed in the slough. January 15–18, 1918.

Ardea herodias wardi. WARD'S HERON.—Resident in moderate numbers; seen occasionally in the sloughs and prairie glades in January, February, and June.

Hydranassa tricolor ruficollis. LOUISIANA HERON.—Common winter visitant; seen by Burgess, December 26–28, 1917; and by Wetmore, February 20–28, 1919; numerous on the glades and along ditches, January 15–26, 1918 after which date they disappeared.

Florida caerulea caerulea. LITTLE BLUE HERON.—Common winter visitant; rare summer visitant; seen by Burgess, December 26–28, 1917; numerous on the glades and along ditches, January 15–26, 1918, associating with Louisiana Herons. Flock of 8 seen, June 12, 1918.

Butorides virescens virescens. GREEN HERON.—Moderately numerous, both in winter and summer; several noted daily, January 15–February 5, in Taylor River slough; about two pairs in same locality, June 12, 1918.

Nycticorax nycticorax naevius. BLACK-CROWNED NIGHT HERON.—Common winter resident; seen by Burgess, December 26–28, 1917; 15–20 living in Taylor River slough, January 15–February 5, 1918.

Nyctanassa violacea. YELLOW-CROWNED NIGHT HERON.—Winter visitant, not common; probably breeds; one adult taken January 15, 1918; three immature individuals seen June 14, 1918; two seen by Wetmore, February 23, 1919.

Grus canadensis mexicana. SANDHILL CRANE.—Rare; a pair of these birds were seen by Mosier every day during the first half of June, 1918, flying to the slough from the sawgrass glades south of the Park, where probably they were nesting; a pair seen also, by Wetmore, February 27, 1919.

Aramus vociferus. LIMPKIN.—Rare summer resident; a pair living on the glade just east of the Hammock, June 12–16, 1918, probably bred there; Wetmore observed three individuals in the same locality, February 20–27, 1919, feeding on marsh snails (Ampullaria depressa).

Rallus elegans. KING RAIL.—Rare resident, probably breeds; seen by Mrs. Byrd, October 12 and 20, and December 24, 1917; several observed in Taylor River slough, January 15 and 21, 1918, and one on the marshy glade adjoining the slough, June 12, 1918.

Porzana carolina. SORA, OR CAROLINA RAIL.—Winter visitant; two specimens caught, January 19, 1918, in rat traps set on the marshy glades.

Ionornis martinicus. PURPLE GALLINULE.—Uncommon winter visitant; single birds seen, January 7, 1917 (Mrs. Byrd), December 27, 1917 (Burgess), January 15 and 20, 1918.

Gallinula chloropus cachinnans.[1] FLORIDA GALLINULE.—Common winter resident; noted by Mrs. Byrd, October 13, and November 11, 1917; numerous in Taylor River slough, January 15–February 5, 1918.

Fulica americana. COOT.—Uncommon winter resident; noted by Mrs. Byrd, January 17 and November 11, 1917; three or four in the slough January 15–26, 1918.

Gallinago delicata. WILSON'S SNIPE.—Two individuals observed by Mosier, December 24, 1917.

Totanus melanoleucus. GREATER YELLOWLEGS.—Rare winter visitant; seen by Mrs. Byrd, December 24, and by Dr. Burgess, December 27, 1907; one specimen collected, January 15, 1918.

Totanus flavipes. YELLOWLEGS.—Flock of 7 observed by Mrs. Byrd, December 24, 1917; seen also by Dr. Burgess, December 26–28, 1917.

Catoptrophorus semipalmatus. WILLET.—Occasional visitant; single individuals observed by Mrs. Byrd, December 24, 1917 and January 4, 1918 on the glade east of the Hammock.

Oxyechus vociferus vociferus. KILLDEER.—Common winter resident on the Everglade prairies; noted on various dates between November 11 and February 5.

Colinus virginianus floridanus. FLORIDA BOB-WHITE.—Rare resident; a pair were living on the borders of Long Pine Key, on the edge of the glades, in June, 1918, probably breeding there. Mr. Mosier has seen two quail in the Hammock proper.

Meleagris gallopavo osceola. FLORIDA TURKEY.—Very rare resident; one seen in the Hammock by Mosier on January 14, 1918.

Zenaidura macroura carolinensis. MOURNING DOVE.—Rare resident; a few seen in December, 1917 (Burgess) and January, 1918.

Chaemepelia passerina passerina. GROUND DOVE.—Uncommon resident; reported by Burgess, December 26–28, 1917; three or four seen in the road through the Hammock in January, 1918 and three around a mule pen on the rock road across the Everglades south of the Park, June 17, 1918.

Cathartes aura septentrionalis. TURKEY VULTURE.—Common resident, less numerous in summer.

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[1] *G. galeata* of the A. O. U. Check-List.

Coragyps urubu. BLACK VULTURE.—Uncommon; six seen over the glades, January 24, 1918; seen by Mrs. Byrd, December 24, and by Dr. Burgess, December 26–28, 1917.

Elanoides forficatus forficatus. SWALLOW-TAILED KITE.—Uncommon summer resident; Mrs. Byrd saw one, May 21, 1915; a single specimen was collected in the pineland just east of the Hammock, June 13, 1918 and two days later, four birds were seen at once sailing over the glades.

Rostrhamus sociabilis. EVERGLADE KITE.—Rare summer resident; one seen by Mrs. Byrd, May 21, 1915. A pair—the first of the season—seen over the glades on January 26 and 27, 1918, but not again during my stay; on June 19, 1918, as I drove out from the Hammock in an automobile, we passed within a few feet of an Everglade Kite sitting on a bush close to the road across the glade. The species was several times observed by Mr. Mosier in October, 1918.

Circus cyaneus hudsonius.[1] MARSH HAWK.—Uncommon winter visitant; single individuals noted January 7, 1917 (Mrs. Byrd); December 27, 1917 (Burgess); January 18, 20, and 30, 1918; and February 23, 1919 (Wetmore).

Accipiter velox. SHARP-SHINNED HAWK —Uncommon winter visitant; single individuals seen, January 15 and 18, 1918.

Buteo borealis (subsp.?). RED-TAILED HAWK.—Uncommon resident; small numbers seen, January 26 and 30, 1918.

Buteo lineatus alleni. FLORIDA RED-SHOULDERED HAWK.—Common resident; found both on Royal Palm Hammock and on the smaller hammocks which dot the everglades; several specimens taken.

Buteo platypterus platypterus. BROAD-WINGED HAWK.—One specimen taken, January 19, 1918, along the road through the Hammock.

Haliaeetus leucocephalus leucocephalus. BALD EAGLE.—Rare resident; single birds seen by Mrs. Byrd, January 7, 1917 and by Mr. Mosier, January 13, 1918.

Cerchneis sparveria paula.[2] LITTLE SPARROW HAWK.—Not uncommon in pineland and between Florida City and the Hammock; has been seen in the Hammock by Mosier.

Pandion haliaetus carolinensis. OSPREY.—Occasional visitant; two seen by Mrs. Byrd, January 4, one by the writer, January 20, and several by Mr. Mosier, October 17, 1918.

Tyto alba pratincola.[3] BARN OWL.—"White" owls are frequently seen in the Hammock by the warden; a feather picked up in the jungle was identified as belonging to this species. In December, 1919, Mr. Mosier picked up a pellet which the owl dropped as he flew from his perch; this was examined in the Biological Survey and found to contain the remains of a cotton rat *Sigmodon hispidus*.

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[1] *C. hudsonius* of the A. O. U. Check-List.
[2] *Falco* of the A. O. U. Check-List.
[3] *Tyto pratincola* of the A. O. U. Check-List.

Strix varia alleni. FLORIDA BARRED OWL.—Common resident on Royal Palm and other smaller hammocks in the Everglades; one specimen taken, January 23, 1918.

Otus asio asio.[1] FLORIDA SCREECH OWL.—Fairly common resident; one heard calling nearly every evening near the Lodge.

Coccyzus americanus americanus. YELLOW-BILLED CUCKOO.—Fairly common summer resident; rare winter resident; single individuals noted by Mrs. Byrd, January 7 and December 24, 1917; numerous, June 12–19, 1918 (one specimen taken).

Streptoceryle[2] alcyon alcyon. BELTED KINGFISHER.—Common winter resident on the glades and about ditches in the pineland.

Campephilus principalis. IVORY-BILLED WOODPECKER.—Very rare resident; in May, 1917, Mr. Mosier found a nest of this species in a dead royal palm stub, about 35 feet from the ground; he had a perfectly clear view of the old birds and of three young sticking their heads out of the hole. He has on a few occasions since then seen or heard this bird, but no indications of breeding were discovered in 1918 or 1919; it was last seen in February, 1919.

Dryobates villosus auduboni. SOUTHERN HAIRY WOODPECKER.—Rare resident; reported by Dr. Burgess, December 26–28, 1917; one seen, January 30, 1918, in pineland east of the Park; one heard calling in the Hammock, June 12, 1918.

Dryobates pubescens pubescens. SOUTHERN DOWNY WOODPECKER.—Uncommon; two seen near the Park lodge, June 12, 1918.

Phrenopicus[3] borealis. RED-COCKADED WOODPECKER. Common resident in pineland between Florida City and the Hammock and on Long Pine Key on the Everglades; Mosier has seen the species in Royal Palm Hammock.

Sphyrapicus varius varius. YELLOW-BELLIED SAPSUCKER.—Rare winter visitant; single individuals seen by Mrs. Byrd, March 11 and November 11, 1917, and by Dr. Burgess, December 26–28, 1917.

Phloeotomus pileatus pileatus. PILEATED WOODPECKER. Uncommon resident in the dense jungle of the Hammock, nesting in royal palms; they are frequently heard, but rarely seen.

Centurus carolinus. RED-BELLIED WOODPECKER.—Common resident, both in the Hammock and in pineland hammocks on Long Pine Key and on the mainland eastward of Royal Palm.

Colaptes auratus auratus. FLICKER.—Occurs in small numbers, at all seasons; a few pairs breed in the Hammock and on Long Pine Key; seen by Mrs. Byrd, October 13, 20, and 27, 1917; and by the writer, January 21–28 and June 12–18, 1918.

Antrostomus carolinensis. CHUCK-WILL'S-WIDOW.—Uncommon summer resident; several were heard singing every evening near the Park lodge, June 12–18, 1918.

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[1] *O. A. floridanus* of the A. O. U. Check-List.
[2] *Ceryle* of the A. O. U. Check-List.
[3] *Dryobates* of the A. O. U. Check-List.

Setochalchis[1] vocifera vocifera. WHIP-POOR-WILL.—Moderately common winter resident; January 15, 1918, I saw two feeding at dusk over the glade east of the Hammock and the next evening shot a specimen in the road; January 24, in the forenoon I saw one in open, rocky pine woods on Long Pine Key, flushing it several times at close range, and the same evening saw two more in the road in Royal Palm Hammock; January 28, about daybreak, I heard one singing a few times. Wetmore observed the Whip-poor-will and heard it singing, February 20–26, 1919.

Chordeiles minor chapmani. FLORIDA NIGHTHAWK.—Moderately common migrant and summer resident; seen by Mrs. Byrd, October 12 and 20 and November 4, 1917; two or three seen every evening, June 12–18, 1918, hawking about the clearing around the Park lodge and others seen frequently over the glades in full daylight.

Archilochus colubris. RUBY-THROATED HUMMINGBIRD.—Rare winter resident; two seen, January 24, 1918.

Tyrannus tyrannus. KINGBIRD.—Common summer resident; June 12, 1918, a pair of Kingbirds were found nesting in a small pond-apple tree on the edge of a slough on the glades north of the Hammock; the nest, which was over the water, contained 4 young birds. Kingbirds were numerous, June 14, in pineland about a mile east of the Hammock, and several were seen, June 17, on Long Pine Key.

Tyrannus dominicensis. GRAY KINGBIRD.—Observed by Dr. Burgess, December 26–28, 1917; this is a common species in summer along the coast, but is rarely seen far from salt water.

Myiarchus crinitus. CRESTED FLYCATCHER.—Moderately common resident; several were heard or seen daily in the Hammock jungle, January 15–February 5, 1918; a pair bred near the Lodge in June and several specimens were collected in a little hammock on Long Pine Key, June 17, 1918; seen also in open pineland east of Royal Palm Hammock.

Sayornis phoebe. PHOEBE.—Common winter resident; seen daily in small numbers during my January visit, chiefly on the prairie glades and around sloughs or ditches; they perch on low bushes over or near the water and make sallies for their food out over the water.

Myiochanes virens. WOOD PEWEE.—Uncommon transient; observed in fall or winter by Mrs. Byrd.

Cyanocitta cristata cristata. FLORIDA BLUE JAY.—Uncommon resident; seen in small numbers, January 15–February 5, 1918, in the Hammock and nearby pinelands; one or two heard calling in the Hammock in June.

Corvus brachyrhynchos pascuus. FLORIDA CROW.—Common resident, less numerous in summer than in winter. In January, 1918, Crows were numerous in the Hammock and on the surrounding glades, often as many as 20 being seen in a flock. They are very tame and several individuals come regularly to a platform close to the lodge to feed on table

[1] *Antrostomus* of the A. O. U. Check-List.

scraps put out for them. One individual with a very high-pitched voice has been noted by Mr. Mosier from time to time for over a year. Only about two pairs bred in the Hammock in 1918; in June, one pair were feeding large young in a nest in the woods close to the lodge.

Corvus ossifragus. FISH CROW.—Rather uncommon and irregular in their appearance; one specimen was collected, January 29, 1918, from a flock of 8 which had alighted in trees near the rock pit; three were seen, February 3, feeding along a ditch on the Everglades, and three in nearly the same place on June 18, 1918.

Agelaius phoeniceus phoeniceus.[1] FLORIDA RED-WING.—Common summer resident; less numerous in winter. A few small flocks and single birds were seen, January 15–25, 1918, on the prairie glades; June 12, several nests containing young and others containing eggs were found in sawgrass and small bushes on the glades.

Sturnella magna argutula. SOUTHERN MEADOWLARK.—Common resident; in January, 1918, small numbers were noted on the prairie glades west of the Hammock, and in June the birds were abundant in the same locality, flying about with large young.

Icterus spurius. ORCHARD ORIOLE.—One was noted, October 13, 1917, by Mrs. Byrd.

Euphagus carolinus. RUSTY BLACKBIRD.—Irregular migrant; about 20 were noted by Mrs. Byrd, October 20, 1917; others January 7 and November 4, 1917.

Quiscalus quiscula quiscula.[2] FLORIDA GRACKLE.—Uncommon winter resident; apparently does not breed in the vicinity of the Hammock, though breeding commonly near Florida City. Single birds were seen, January 19, 26, and 30 and a flock of 30 on February 3, flying to a roost to the southward of the Park.

Megaquiscalus major major. BOAT-TAILED GRACKLE.—Common at all seasons on the wet everglades around the Hammock, breeding in tall reeds in the sloughs. Nearly full-grown young were flying with the adults by the middle of June, and all seemed to be going at night to a common roost south of the Park.

Passerculus sandwichensis savanna. SAVANNAH SPARROW.—Fairly common winter resident; seen in small numbers on the everglade prairie west of the Hammock, January 19–28, 1918; the birds were living around seed beds and apparently caused some damage by nipping off young tomato plants. Six birds of this species were noted by Mrs. Byrd, December 24, 1917.

Ammodramus savannarum (australis?). GRASSHOPPER SPARROW. Rare winter resident; observed by Mrs. Byrd, December 24, 1917 (4 individuals), and January 4, 1918; one specimen taken (but not saved) January 25, on Long Pine Key.

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[1] *A. p. floridanus* of the A. O. U. Check-List.

[2] *Q. q. aglaeus* of the A. O. U. Check-List.

Zonotrichia albicollis. WHITE-THROATED SPARROW.—Rare winter resident; six observed by Mrs. Byrd, November 4, 1917; seen also by Dr. Burgess, December 26–28, 1917; I saw none in January.

Melospiza melodia melodia. SONG SPARROW.—Rare winter resident; small numbers seen by Mrs. Byrd, November 11 and December 24, 1917 and January 3, 1918.

Melospiza georgiana. SWAMP SPARROW.—Rare winter resident; seen by Mrs. Byrd, December 24, 1917, and January 4, 1918, and by Dr. Wetmore, February 22, 27, and 28, 1919; I observed a few in thick brush or sawgrass, January 15, 20, 24, and 30, 1918.

Pipilo erythrophthalmus alleni. WHITE-EYED TOWHEE.—Rare winter resident; none seen in summer. One or two birds were living in thick scrub on the edge of the heavy jungle, January 15–February 5, 1918; their notes were heard nearly every morning, but the bird was so shy that it was seen only once.

Cardinalis cardinalis floridanus. FLORIDA CARDINAL.—Abundant resident, though less conspicuous in winter by reason of not being in song. In summer, this is probably the most abundant bird in the Hammock. Heard singing at all hours of the day, from daybreak to sundown.

Zamelodia ludoviciana. ROSE-BREASTED GROSBEAK.—Rare migrant; one noted by Mrs. Byrd, December 24, 1917.

Passerina ciris. PAINTED BUNTING.—Rare winter resident; single individuals observed by Mrs. Byrd, March 11, 1917 and by the writer, January 25 and February 4, 1918.

Piranga rubra rubra. SUMMER TANAGER.—Rare summer resident; only one male was seen in the Hammock in June, singing every day from tall live oaks near the Lodge. One or two were noted in pineland east of the Hammock.

Progne subis subis. PURPLE MARTIN.—Abundant migrant; Mrs. Byrd describes a very large flight of Martins in November, 1917, as follows:

"At 4 p. m., November 4, the Martins were observed circling over a glade at edge of Park, and as far as we could see. Starting home (toward Homestead) they did not diminish in numbers until we had gone nine miles. We roughly estimated ten to the acre. In places the air was thickly peppered with them. There might have been anywhere from a hundred thousand to a million or more. Again late in the afternoon of November 11th, we saw great flocks of swallows over the glades. Some were Martins, some Cliff Swallows."

Petrochelidon albifrons albifrons.[2] CLIFF SWALLOW.—Common migrant; Mrs. Byrd observed the species in numbers on November 11, 1917, as described under *Progne subis*.

Hirundo rustica erythrogastris.[3] BARN SWALLOW.—Uncommon migrant; three seen by Mrs. Byrd, October 27, 1917.

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[2] *P. lunifrons* of the A. O. U. Check-List.
[3] *H. erythrogastra* of the A. O. U. Check-List.

Iridoprocne bicolor. TREE SWALLOW.—Common winter resident; observed by Mrs. Byrd on October 12 and 27 and December 24, 1917; I saw small flocks of 10 to 20 birds flying northward over the everglades, January 18, 24, and 25, 1918.

Bombycilla cedrorum. CEDAR WAXWING.—Rare and irregular migrant; seen several times by Mr. Mosier.

Lanius ludovicianus ludovicianus. LOGGERHEAD SHRIKE.—Moderately common resident of the pine and prairie regions around Homestead; rare in the Hammock but has been seen there by Mr. Mosier.

Vireosylva olivacea. RED-EYED VIREO.—Uncommon migrant; seen by Dr. Burgess, December 26–28, 1917.

Vireosylva gilva gilva. WARBLING VIREO.—Uncommon migrant; one was seen, January 7, 1917, by Dr. Herbert R. Mills and Mr. Oscar E. Baynard.

Lanivireo solitarius solitarius. BLUE-HEADED VIREO.—Rare winter resident; one specimen taken, January 28, 1918; noted by Mrs. Byrd, January 7, 1917 and by Dr. Burgess, December 26–28, 1917.

Vireo griseus maynardi. KEY WEST VIREO.—Fairly common, both summer and winter, in the dense hammock jungle; noted in late December by Dr. Burgess and in late January by the writer; one was heard singing February 1, 1918. Specimens of this race were taken on February 2 and June 17, 1918.

Vireo griseus griseus. WHITE-EYED VIREO.—A specimen of this northern race was taken in the Hammock, January 25, 1918.

Mniotilta varia. BLACK-AND-WHITE WARBLER.—Migrant and possible rare winter resident; noted by Mrs. Byrd, January 7, 1917.

Vermivora ruficapilla ruficapilla. NASHVILLE WARBLER.—Migrant and rare winter resident; individuals were noted by Mrs. Byrd, October 12 and 27, and December 24, 1917; also by Dr. Burgess, December 26–28, 1917. Mrs. Byrd has seen the species a number of times at Silver Palm Hammock, near Princeton, and has identified specimens caught by a cat.

Vermivora celata celata. ORANGE-CROWNED WARBLER.—Rare winter resident; one seen by Mrs. Byrd, January 4, 1918.

Compsothlypis americana subsp. PARULA WARBLER.—Occasional in migration; seen on numerous occasions by Mrs. Byrd.

Dendroica caerulescens. BLACK-THROATED BLUE WARBLER.—Reported quite common by Mr. Mosier, October 18, 1918; arrived about October 5.

Dendroica coronata coronata. MYRTLE WARBLER.—Common winter resident, found in open timber, scrubby tracts, and along roadsides. Observed in numbers by Mrs. Byrd, December 24, 1917 and by the writer, January 24–February 5, 1918.

Dendroica dominica dominica. YELLOW-THROATED WARBLER.—Rare winter resident; noted by Mrs. Byrd, January 7, 1917.

Dendroica vigorsi. PINE WARBLER.—Common resident of the pinelands between Florida City and Royal Palm Hammock and on Long Pine

Key; has been seen in the Hammock by Mosier. The birds were heard singing on January 24 and 28, 1918; a full-grown young bird was collected on June 13.

Dendroica palmarum palmarum. PALM WARBLER.—Common winter resident in the open parts of the Hammock and along roadsides in the pineland. Observed by Mrs. Byrd, October 20 and 27, 1917; by Dr. Burgess, December 26–28, 1917 and by the writer, January 15–February 5, 1918. In January, several birds came regularly to feed at a feeding stand near the Park lodge.

Dendroica discolor. PRAIRIE WARBLER.—Rare winter resident; observed by Dr. Burgess, December 26–28, 1917. The species breeds on the coast near Florida City, but not, so far as known in the vicinity of the Hammock.

Seiurus aurocapillus aurocapillus. OVEN-BIRD.—Fairly common winter resident; noted by Mrs. Byrd, October 20 and 28, 1917, by Dr. Burgess, December 26–28, 1917, and by the writer, January 15–February 5, 1918. Most of the birds stay in the dense jungle and they are so quiet and retiring that it is difficult to say how numerous they are. Two birds living near the Park lodge became very tame, coming to the doorstep and the feeding stand to pick up crumbs and at times almost walking over an observer's feet. One bird was caught in a mouse trap set in palmetto scrub in a clearing.

Seiurus noveboracensis subsp. WATER THRUSH.—Mrs. Byrd reports seeing large numbers of these birds along ditches in the Park one day in fall (date not recorded). Wetmore saw one in the Hammock, February 21, 1919.

Geothlypis trichas ignota. FLORIDA YELLOW-THROAT.—Occurs in small numbers, both in winter and summer, in patches of sawgrass or rushes on the glades, or in dense palmetto scrub in the Hammock. Specimens taken.

Setophaga ruticilla. REDSTART.—Migrant; Mosier states that a swarm of Redstarts invaded the Hammock about May 1, 1918, for a week. [A warbler heard singing in the heavy jungle on June 13 sounded somewhat like this species, but it could not be satisfactorily identified.]

Mimus polyglottos polyglottos. MOCKINGBIRD.—Occurs in small numbers in winter in the Hammock, and more commonly on Long Pine Key; none bred in the Hammock in 1918 and only one was observed on Long Pine Key. In January, the first song was heard on the 26th and on January 30, one bird was singing vigorously.

Dumetella carolinensis. CATBIRD.—Fairly common winter resident in the Hammock and on Long Pine Key.

Thryothorus ludovicianus miamensis. FLORIDA WREN.—Common resident of the dense hammock jungle, less conspicuous in winter; found also on Long Pine Key. In late January songs were occasionally heard in the early morning; in June the birds sing at any time ofday.

Troglodytes aedon (subsp.?). HOUSE WREN.—Rare winter resident; single birds were noted by Mrs. Byrd, January 7, 1917, by Dr. Wetmore, February 21 and 23, 1919, and by the writer (on Long Pine Key), January 24 and 28, 1918.

Cistothorus stellaris. SHORT-BILLED MARSH WREN.—Two individuals were observed, January 24, 1918, in dense grass on the glades; they flushed several times at close range and flying a short distance, settled into the grass again.

Telmatodytes palustris iliacus. PRAIRIE MARSH WREN.—Uncommon winter resident; one or two seen frequently in January in patches of reeds on the glades; a specimen taken January 29, 1918, is referable to this form.

Certhia familiaris americana. BROWN CREEPER.—Rare winter resident; Mosier states that he has several times seen this bird in the Hammock in March and April.

Sitta carolinensis carolinensis. WHITE-BREASTED NUTHATCH.—Rare migrant; Mosier sees a few in the Hammock every spring and fall.

Sitta pusilla. BROWN-HEADED NUTHATCH.—Resident in small numbers in the pineland east of the Hammock; several specimens, adult and full-grown young, were taken there, June 13, 1918.

Baeolophus bicolor. TUFTED TITMOUSE.—Has been seen once in the Hammock by Mrs. Byrd—date not recorded.

Corthylio[1] **calendula calendula.** RUBY-CROWNED KINGLET.—Rare winter resident; one observed by Mrs. Byrd, January 4, 1918.

Polioptila caerulea caerulea. BLUE-GRAY GNATCATCHER.—Uncommon winter resident; noted by Mrs. Byrd, January 7, 1917, by Dr. Burgess, December 26–28, 1917; by Dr. Wetmore, February 21–27, 1919; and by myself, January 18–28, 1918.

Hylocichla guttata pallasi. HERMIT THRUSH.—Rare winter resident; one was seen, January 26 and 30, 1918, around the edge of the clearing near the Park lodge; noted also by Dr. Burgess, December 26–28, 1917.

Planesticus migratorius migratorius. ROBIN.—Moderately common winter resident; small numbers seen in the Hammock on several days in late January and a flock of about 25 on Long Pine Key, January 28, 1918; noted by Mrs. Byrd, January 7 and December 24, 1917, and by Dr. Wetmore, February 21–26, 1919. Specimens taken January 24 and 28, 1918, proved to belong to the northern race.

Sialia sialis sialis. BLUEBIRD.—Fairly common resident in the pineland east of the Hammock where adults and full-grown young were seen June 13, 1918; two pairs were seen on Long Pine Key, January 24, 1918; a pair nested close to the lodge in the Hammock in the spring of 1918.

Biological Survey, U. S. Dept. Agr., Washington, D. C.

[1] *Regulus* of the A. O. U. Check-List.

SIXTH ANNUAL LIST OF PROPOSED CHANGES IN THE A. O. U. CHECK-LIST OF NORTH AMERICAN BIRDS.

BY HARRY C. OBERHOLSER.

THIS is the Sixth Annual List of Proposed A. O. U. Check-List additions and changes in the names of North American birds. Like the five already published,[1] the present list comprises only ornithological cases—*i. e.*, such as require specimens or the identification of descriptions for their determination—and consists of additions, eliminations, rejections, and changes of names due to various causes. However, only changes known to be the result of revisionary work are included; therefore no mention is here made of changes involved in names in local lists or elsewhere, used without sufficient explanation or not known to be based on original research, of changes or additions queried or but tentatively made, or of the elimination of subspecies by authors who, on general principles, recognize no subspecies. No action by the A. O. U. Committee has yet been taken on any of the proposed changes here listed; nor is any opinion beyond that of compiler herein expressed.

This list is intended to include everything pertinent up to December 31, 1920, and nothing after that date has been taken. In view of the volume and widely scattered character of current ornithological literature, it is not at all unlikely that some names or changes have been overlooked, and the writer would be very thankful for reference to any omissions, in order that such may be duly given a place in next year's list.

ADDITIONS AND CHANGES IN NAMES.[2]

Colymbus holboellii (Reinhardt) becomes **Colymbus grisegena holboellii** (Reinhardt), because only subspecifically distinct from *Colymbus grisegena*. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1449.)

[1] For these previous lists, see 'The Auk,' XXXIII, October, 1916, pp. 425–431; XXXIV, April, 1917, pp. 198–205; XXXV, April, 1918, pp. 200–217; XXXVI, April, 1919, pp. 266–273; XXXVII, April, 1920, pp. 274–285.

[2] Additions to the A. O. U. Check-List, the Sixteenth and Seventeenth Supplements, and the First to Fifth Annual Lists are marked with a dagger (†). Generic (and subgeneric) names so indicated have not hitherto stood in the lists in either generic or subgeneric sense.

†**Atalolestris** Mathews. New subgenus (of *Stercorarius*). Mathews, Birds Australia, II, pt. 5, January 31, 1913, p. 500; type by original designation and monotypy, *Stercorarius longicaudus* Vieillot.

Thalassarche culminata culminata (Gould) becomes **Thalassarche chrysostoma** (Forster), because both these specific names are considered to be applicable to the same bird, and the latter has priority. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1442.)

Puffinus l'herminieri Lesson becomes **Puffinus assimilis l'herminieri** Lesson, because but a subspecies of **Puffinus assimilis.** (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1422.)

Anas platyrhyncha Linnaeus becomes **Anas boschas** Linnaeus, because the former name is not certainly identifiable. (*Cf.* Chernel von Chernelhazi, Nomencl. Avium Regni Hungariae, 1918, pp. 63, 69.

†**Anas novimexicana** Huber. New species. Huber, The Auk, XXXVII No. 2, April, 1920, p. 273 (Rio Grande, west of Las Cruces, Dona Ana County, New Mexico). Range: Rio Grande Valley in New Mexico.

Marila marila Linnaeus becomes, so far as North America is concerned, **Nyroca marila nearctica** (Stejneger) (*A[ythya]. marila nearctica* Stejneger, Bull. U. S. Nat. Mus., No. 29, 1885, p. 161; Nearctic Region: Arctic Coast to Guatemala), since the North American bird proves to be subspecifically distinct from that of the Old World. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft X [Band II, Heft 4], March, 1920, p. 1344).

Melanitta deglandi (Bonaparte) becomes **Melanitta fusca deglandi** (Bonaparte) because considered only subspecifically distinct from *Melanitta fusca.* (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1357.)

Melanitta deglandi dixoni (Brooks) becomes **Melanitta fusca dixoni** (Brooks) because considered only subspecifically distinct from *Melanitta fusca.* (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI-XII [Band II, 5–6], August, 1920, p. 1357.)

Chen hyperboreus nivalis (Forster) becomes **Chen caerulescens nivalis** (Forster), because of the merging of **Chen hyperboreus** with **Chen caerulescens.** (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft X [Band II, Heft 4], March, 1920, p. 1292.)

Branta nigricans (Lawrence) becomes **Branta bernicla nigricans,** since it is considered only subspecifically different. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft X [Band II, Heft 4], March, 1920, p. 1295.)

†**Rallus longirostris insularum** Brooks. New subspecies. Brooks, Proc. New England Zool. Club, VII, June 24, 1920, p. 53 (Big Pine Key, Florida). Range: Florida Keys, Florida.

†**Rallus longirostris helius** Oberholser. New subspecies. Oberholser, Proc. Biol. Soc. Wash., XXXIII, July 24, 1920, p. 33 (sixth key in

the Newfound Harbor group, southwest of Big Pine Key, Florida). Range: Florida Keys.

Gallinago Koch becomes **Capella** Frenzel (Beschr. Vögel und Eyer Gegend Wittenberg. Naturg. Churkr., 1801, p. 58; type by monotypy, *Scolopax cœlestis* Frenzel) because of equal pertinence and earlier date. (*Cf.* Mathews and Iredale, Austral Avian Record, IV, Nos. 4–5, December 16, 1920, p. 131.) The North American forms of the genus *Gallinago* will therefore now become

Capella gallinago gallinago (Linnaeus).
Capella gallinago delicata (Ord).
Capella media (Latham).

†**Limnocryptes gallinula** (Linnaeus). **Scolopax gallinula** Linnaeus, Syst. Nat., ed. 12, I, 1766, p. 244 ("Europae paludibus"). Obtained on St. Paul Island, Pribilof Islands, Alaska. (*Cf.* Hanna, Condor, XXII, No. 5, September 24, 1920, p. 173.)

Canutus canutus (Linnaeus) becomes **Canutus canutus rufus** (Wilson) because the American bird is subspecifically separable from that of the Old World. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1588.)

†**Squatarola squatarola hypomela** (Pallas). *Charadrius hypomelus* Pallas, Reise versch. Prov. Russ. Reichs, III, 1776, p. 699 ("paludes borealis orae"). (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, pp. 1554–1555.) Range: Breeds in northeastern Asia and Alaska; migrates to Ceylon, New Zealand, and Peru.

†**Lagopus leucurus rainierensis** Taylor. New subspecies. Taylor, Condor, XXII, No. 4, August 10, 1920, p. 146 (Pinnacle Peak. 6200 feet altitude, Mount Rainier, Wash.). Range: Cascade Mountains of Washington.

Elanus leucurus (Vieillot) becomes **Elanus axillaris majusculus** Bangs and Penard, new subspecies (*Elanus leucurus majusculus* Bangs and Penard, Proc. New England Zoöl. Club, VII, February 19, 1920, p. 46; San Rafael, Calif.), because of this new race, and because *Elanus leucurus* is regarded as a subspecies of *Elanus axillaris* (Latham) (*cf.* Swann, Synopt. List Accipitres, III, 1920, p. 103.)

†**Buteo lineatus extimus** Bangs. New subspecies. Bangs, Proc. New England Zoöl. Club, VII, January 16, 1920, p. 35 (Cape Florida, Fla.). Range: Florida Keys, Florida.

†**Hierofalco rusticolus islandus** (Brünnich). Recorded from southern Greenland and northeastern North America (*cf.* Swann, Synopt. List Accipitres, III, 1920, p. 103), and thus reinstated as a North American bird.

Aeronautes melanoleucus Baird becomes **Aeronautes saxatalis** (Woodhouse) (*Acanthylis saxatalis* Woodhouse, in Sitgreaves' Report Exped. Zuni and Colo. Riv., 1853, p. 64; Inscription Rock, New Mexico), because the latter name is of equal pertinence and earlier date. (*Cf.* Oberholser, The Auk, XXXVII, No. 2, April, 1920, p. 294.)

Tyrannus dominicensis (Gmelin) becomes **Tyrannus curvirostris** (Hermann) (*Sitta curvirostris* Hermann, Tabula Affinit. Anim., 1783, p. 204; Jamaica), because the latter name is of equal pertinence and earlier date. (*Cf.* Stresemann, Novit. Zoöl., XXVII, No. 1, June 15, 1920, p. 329.)

†**Otocoris alpestris sierrae** Oberholser. New subspecies. Oberholser, Condor, XXII, No. 1, January 26, 1920, p. 34 (head of Pine Creek, Lassen County, California). Range: Breeds in the northern Sierra Nevada, California; winters also in the Sacramento Valley, California.

†**Perisoreus canadensis albescens** Peters. New subspecies. Peters, Proc. New England Zoöl. Club, VII, May 4, 1920, p. 51 (Red Deer, Alberta, Canada). Range: Southern Alberta.

†**Perisoreus barbouri** Brooks. New species. Brooks, Proc. New England Zoöl. Club, VII, March 11, 1920, p. 49 (Ellis Bay, Anticosti Island, Gulf of St. Lawrence, Quebec, Canada). Range: Anticosti Island, Quebec.

†**Euphagus cyanocephalus minusculus** Grinnell. New subspecies. Condor, XXII, No. 4, August 10, 1920, p. 153 (Palo Alto, Santa Clara County, California). Range: California.

†**Passerella iliaca annectens** Ridgway, The Auk, XVII, No. 1, January, 1900, p. 30 (Yakutat, Alaska). Revived as a subspecies for the breeding Fox Sparrows from Cross Sound to Prince William Sound, Alaska. (*Cf.* Swarth, Univ. Calif. Publ. Zool., XXI, No. 4, September 11, 1920, pp. 140–144.)

†**Passerella iliaca sinuosa** Grinnell, Univ. Calif. Publ. Zool., V, No. 12, March 5, 1910, p. 405 (Drier Bay, Knight Island, Prince William Sound, Alaska). Recognized as a subspecies for the breeding Fox Sparrows of the Prince William Sound region and the Kenai Peninsula, Alaska. (*Cf.* Swarth, Univ. Calif. Publ. Zool., XXI, No. 4, September 11, 1920, pp. 135–140.)

†**Petrochelidon albifrons hypopolia** Oberholser. New subspecies. Oberholser, Canadian Field Naturalist, XXXIII, No. 5, Nov., 1919 (Jan. 3, 1920), p. 95 (Fort Norman, Mackenzie, Canada). Range: Breeds from Montana to Alaska; migrates through Wyoming and California, probably to South America.

†**Lanius ludovicianus mearnsi** Ridgway, Proc. Biol. Soc. Wash., XVI, Sept. 30, 1903, p. 108 (San Clemente Island, Calif.). Revived as a subspecies. (*Cf.* Oberholser, Wilson Bulletin, XXXI, No. 3, Sept., 1919, p. 89.) Range: San Clemente Island, California.

†**Thryomanes bewickii cerroensis** (Anthony). *Thryothorus cerroensis* Anthony, The Auk, XIV, No. 2, April, 1897, p. 166 (Cerros Island, Lower California). Revived as a subspecies to include the breeding Bewick Wrens from middle Lower California. (*Cf.* Oberholser, Wilson Bulletin, XXXII, No. 1, March 27, 1920, p. 21.)

†**Thryomanes bewickii ariborius** Oberholser. New subspecies. Oberholser, Wilson Bulletin, XXXII, No. 1, March 27, 1920, p. 25 (Agassiz, British Columbia). Range: southwestern British Columbia and northwestern Washington.

Cyanosylvia Brehm becomes **Luscinia** Forster (Synopt. Cat. Brit. Birds, 1817, p. 14; type by monotypy and tautonymy, *Motacilla luscinia* Linnaeus), because not generically separable. (*Cf.* Hartert, Pract. Handb. Brit. Birds, pts. 7–8, April 8, 1920, p. 467.)

REJECTIONS AND ELIMINATIONS.[1]

***Puffinus griseus stricklandi** Ridgway = **Puffinus griseus** (Gmelin). (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1426.)

***Puffinus griseus chilensis** (Bonaparte) = **Puffinus griseus** (Gmelin). (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1426.)

***Phalacrocorax carbo americanus** Reichenbach = **Phalacrocorax carbo carbo** (Linnaeus), because not subspecifically distinct. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, pp. 1387–1388.)

***Phalacrocorax pelagicus robustus** Ridgway = **Phalacrocorax pelagicus pelagicus** Pallas, because not subspecifically different. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, p. 1393.)

***Querquedula discors albinucha** Kennard = **Querquedula discors** (*Linnaeus*). Eliminated, because considered a difference of age or a color phase. (*Cf.* Arthur, The Auk, XXXVII, No. 1, January, 1920, pp. 126–127.)

***Somateria mollissima islandica** Brehm = **Somateria mollissima mollissima** (Linnaeus), as considered not separable. (*Cf.* Hartert, Vögel paläarkt. Fauna, Heft XI–XII [Band II, 5–6], August, 1920, pp. 1367–1368.)

***Chen hyperboreus hyperboreus** (Pallas) = **Chen caerulescens caerulescens** (Linnaeus), because only a color phase. (*Cf.* Hesse, Journ. f. Ornith., LXIII, Heft 2, 1915, pp. 158–160; Hartert, Vögel paläarkt. Fauna, Heft X [Band II, Heft 4], March, 1920, p. 1291.)

Branta canadensis hutchinsii (Richardson) vs. **Branta canadensis** (Linnaeus). Proposed slimination as a subspecies (*cf.* Figgins, The Auk, XXXVII, No. 1, January, 1920, pp. 94–102) rejected. (*Cf.* Swarth, The Auk, XXXVII, No. 2, April, 1920, pp. 268–272).

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[1] Eliminations from the A. O. U. Check-List, the Sixteenth and Seventeenth Supplements, and the First to Fifth Annual Lists, are designated by an asterisk (*). Generic (and subgeneric) names so marked are merely discontinued in both generic and subgeneric sense, while the species included under them remain in the lists.

Branta canadensis occidentalis (Baird) vs. **Branta canadensis** (Linnaeus). Proposed elimination as a subspecies (*cf.* Figgins, THE AUK, XXXVII, No. 1, January, 1920, pp. 94–102) rejected. (*Cf.* Swarth, THE AUK, XXXVII, No. 2, April, 1920, pp. 268–272).

Branta canadensis minima Ridgway vs. **Branta minima** Ridgway. Proposed change in status (*cf.* Figgins, THE AUK, XXXVII, No. 1, January, 1920, pp. 94–102) rejected. (*Cf.* Swarth, THE AUK, XXXVII, No. 2, April, 1920, pp. 268–272).

Biological Survey, U. S. Dept. Agr., Washington, D. C.

GENERAL NOTES

A Loon (Gavia immer) Caught on a Fishing Line.—Under this heading, Mr. Verdi Burtch in 'The Auk' for April, 1920, calls attention to the capture of a Loon, while trolling for bass. Though I have never taken any of our loons while trolling, I have caught a score or more while fishing with live bait, in the waters of San Diego Bay. There have been times, when live bait was not easily obtained, that the Loons were quite annoying and could have been taken almost as easily as the bass or sea trout, which were the real objective.

The Red-throated Loon was as often captured as its larger relation and either never failed to furnish a lively fight before being at last "brought to gaff."

. In every case where I have hooked a Loon, the bait was taken near the bottom and with a run, that led me to think I had to deal with one of the several species of shark, that abound in these waters. The bird seldom, if ever came to the surface with the bait—usually a smelt—before it had been hooked and then only for air. They always furnished abundance of "fight" and usually taxed rod and reel to the limit. At times when an attempt was made to escape along the surface of the water, I found that the strain on the line was reduced at least 50%. From the fact that the hook was often well down in the throat, I think that fish are often swallowed without coming to the surface.—A. W. ANTHONY, *Natural History Museum, Balboa Park, San Diego, Calif.*

Dovekie (Alle alle) at Wallop's Island, Va.—An immature female Dovekie was taken on an oyster rock at low tide near Wallop's Island, about five miles from Chincoteague, Va., on February 2, 1921, and is now in my possession. A small flock of these birds had been reported previously several miles out in the ocean east of the town.—B. H. WARREN, *West Chester, Pa.*

King Eider (Somateria spectabilis) in Pennsylvania.—Through the courtesy of Mr. Boyd P. Rothrock, curator of the Pennsylvania State Museum, Harrisburg, Pa., I am able to report the capture of four specimens of the King Eider, on the Susquehanna River at a point opposite Harrisburg, not far from West Fairview, on December 7, 1920. Mr. Rothrock writes me that an assistant of his sighting five ducks, which he at first took to be Canvasbacks, paddled out to within shooting distance and with a Winchester pump gun secured four of them. Three of these are females and one a young male showing a considerable amount of white on the breast. The male and one of the females were sent to me for examination by Mr. Rothrock and thanks to his generosity the latter is now in the Pennsylvania study series at the Academy of Natural Sciences, Philadelphia, while the other three are being mounted at the State Museum.

Curiously enough on January 11, 1921, Mr. Brent M. Morgan of Washington, D. C., sent me a clipping from an issue of the 'Liverpool [Pa.] Sun,' published early in the present year in which it is stated that: "B. F. Lower, while poling a boat along the river one day last week was fortunate enough to kill a large Eider duck with his pole. The wild Eider duck is a rare species in this vicinity and has a beautiful plumage."

Liverpool is in Snyder County, about thirty miles above Harrisburg, on the west side of the Susquehanna, so that it would seem that there were more Eiders present than those reported by Mr. Rothrock. Requests for further information from the editor of the paper have met with no response, but the allusion to the beauty of the plumage would seem to indicate the presence of an adult male. So far as I am aware this is the first record of the King Eider for the State, with the exception of the flock reported by Dr. Warren on Erie Bay, November 30, 1889 (Birds of Pennsylvania, 2nd ed. p. 46.).—Witmer Stone, *Academy of Natural Sciences, Philadelphia.*

The Blue Goose in the Province of Quebec.—On October 10, 1917, an adult Blue Goose (*Chen caerulescens*) was shot by Mr. Charles Frémont, of Quebec, P. Q., at Cap Tourmente, Montmorency County, P. Q. Cap Tourmente is on the north shore of the St. Lawrence River, about twenty-five miles below Quebec City. The Blue Goose was with a flock of Greater Snow Geese (*Chen hyperboreus nivalis*) when taken.

On October 16, 1920, a juvenile Blue Goose was shot at the same place by Mr. H. des Rivières of Quebec, P. Q. This bird also was in the company of a flock of Greater Snow Geese when taken. Mr. des Rivières informs me that the Greater Snow Geese would not permit the Blue Goose to mingle freely with them, but kept it always at a distance of at least several feet from their flock.

Both of these Blue Geese were taken in the flesh to Mr. C. E. Dionne, curator of the museum of Laval University, Quebec, P. Q., by whom they were mounted. They were not sexed. When seen by me they were mounted and were in the possession of Mr. Frémont and Mr. des

Rivières, respectively. They were identified by me within a short time after I had examined the series of skins of Blue Geese and Snow Geese in the possession of Mr. J. H. Fleming, of Toronto, Ont. I completed the identification of Mr. des Rivières' juvenile bird by writing down a detailed description of the specimen while it was before me and later comparing the description, in Toronto, with a skin of a juvenile Blue Goose in Mr. Fleming's possession.

There appear to be no previous records of the Blue Goose in the Province of Quebec.—Harrison F. Lewis, *Bergerville, P. Q.*

Blue Geese (Chen caerulescens) in Massachusetts.—The following records of Blue geese taken in Massachusetts do not seem to have been reported.

One (sex?) shot at Long Point, Silver Lake, Plympton, Mass., late in November, 1914. The specimen was mounted and is now kept in a camp at Oldham Pond, Pembroke.

One (sex?) shot at Accord Pond, South Hingham, Mass., October 29, 1920. Specimen not saved, but seen by Mr. A. B. Gardner after it had been plucked for use as food. John C. Phillips, *Wenham, Mass.*

Massachusetts Geese.—The autumn of 1920 was remarkable for what was probably the largest flight of Canada Geese that has been seen in eastern Massachusetts, at least in recent times. Geese started moving the first week in October, and this early flight was large. There seem to have been very few days from early October to early January of the present year that flocks were not seen at some point between Weymouth and Duxbury. The November flight started early and lasted with very little interruption the rest of the month, the bulk probably passing between November 20 and 26, during which period there was continual "dirty" weather; sleet, snow, fog, north-east and north gales. These extremely unfavorable conditions for migration forced geese into small ponds, marshes, and even fields, so exhausted did they become. Consequently many were shot outside the regular goose "stands," how many we cannot tell. It was remarked by Massachusetts gunners that there seemed to be a large proportion of young geese, and the same was true of Currituck Sound, N. C.; where geese also appeared in unusual numbers and were very tame. The tameness of the geese in Massachusetts this past season caused comment everywhere, and I saw instances of it myself.

The figures which I have gathered on the numbers taken are not complete, but they do include nearly all the largest shooting stands. Added together they give a total of 4749 for eastern Massachusetts, without allowing anything for numbers killed on small ponds, or during flight. This may bring the number actually shot up to 5000. It is interesting to compare this with a count taken on three other years in the same way. In 1908 about 1450, in 1909 about 1900, and in 1911 about 3518, this last being the biggest year up to that time ('The Auk,' 1912, p. 390).

In 1910 ('The Auk,' p. 268) I pointed out that the average yearly number of geese seen from a single point at Oldham Pond, Pembroke was 1145. This year 2876 geese were seen at this same place, and at least 1400 of them came into the pond. This count does not include some flocks that came in and went out during the night.

I suggested in 1912 that our Atlantic coast flight of Canada Geese showed signs of being on the increase. I think now that there is no doubt about this. The numbers taken this year seem to some people excessive, but the chance to shoot so many will probably not occur again in many years. The favorable conditions were due to a combination of a great breeding year, with a heavy flight, which happened to meet extremely hard weather after it had started. In Labrador the past season has been one of great scarcity of foxes, following one of the cycles in which mice and rabbits die off in great numbers. This may have something to do with an extra successful breeding year for geese resulting in large numbers of young.

It is quite interesting to compare our Massachusetts figures with those which I have recently seen for the State of Minnesota. The hunters of that state have reported only 2330 Canada Geese shot during the two years 1919–1920 (MS. of State Game Comm. Report).

Some geese having heavy oil, of a black, tarry consistency on their underparts, were shot in Massachusetts ponds last autumn. I saw one or two geese shot with this oil upon them at Currituck Sound, N. C., in December, and I heard of several others taken there in the same plight.

Swans were again reported in Massachusetts. Two flocks, one of eleven, and one of seven came into Duxbury Bay, but I have not the dates.—JOHN C. PHILLIPS, *Wenham, Mass.*

The Whistling Swan (Olor columbianus) on the coast of South Carolina.—About three o'clock P. M., on January 17, 1921, my wife called my attention to a very large white bird flying over our yard and about to alight in the water near our house while we were sitting on the piazza. I cautiously approached the place under cover and to my astonishment found the huge bird to be an adult Swan. I then retreated and went back into the house for my gun and glasses, came back under cover and approached it to within 150 feet and saw it feeding by immersing its long neck under the water. I watched this bird through good glasses hoping to see the position of the nostrils, but was unable to do so nor did I have the heart to shoot so beautiful a bird. It was an enormous bird and may have been an example of the very rare Trumpeter Swan (*Olor buccinator*) for which there is no South Carolina record. The bird was constantly on the alert and finally flew away in a southerly direction.

The Whistling Swan—which I suppose this bird must have been—is rare in South Carolina, but I have in my collection a young bird of the year taken at Ridge Springs, Edgefield County, South Carolina, on November 26, 1907, which was given to me by Dr. Jonathan Dwight, and

recorded by me in 'The Auk,' XXV, 1908, 217-218. ARTHUR T. WAYNE, *Mount Pleasant, South Carolina.*

Whistling Swan—A Correction.—Through a typographical error my record of *Olor columbianus*, Whistling Swan, at Elizabeth, N. J., October 29, 1916, on p. 120, January 'Auk' appeared without a question mark, and as it turns out, the identification was wrong. Mr. W. De W. Miller, of the American Museum of Natural History, to whom I reported the capture of the bird, also saw it and he has kindly notified me that the specimen (a young bird) was not *O. columbianus* but was *Cygnus olor*, the Mute Swan, which he states is now naturalized and wild on the Hudson River and the coast of New Jersey. Dr. Stone also informs me that one of this species was found dead on the ice at Beach Haven, N, J., January 8, 1920 and that another obtained on the south Jersey coast narrowly escaped being published as a Trumpeter! Swan records of the future must evidently be carefully scrutinized.—CHARLES A. URNER, *Elizabeth, New Jersey.*

An Egret (Herodias egretta) Record from Oswego County, N. Y.—While recently examining a small local collection of mounted birds, I was somewhat surprised to find an excellently preserved specimen of the Egret. The bird was shot in August, 1887, at Mexico Point, Lake Ontario, by E. E. Chapman of this village. Although there are a number of published records of the occurrence of this species in the interior of New York, it must be remembered that the Egret is only an occasional summer visitant here, and that its presence at any time is at once worthy of note.

The present specimen was apparently mounted by a good taxidermist, and has been carefully kept all these years in a glass case. The plumage is remarkably white; moreover, the black of the legs and feet, the yellow bill with its blackish tip, and the orange lores—all appear as fresh as though the bird had been taken only recently. Inasmuch as the case could not be opened, it was possible to estimate, only, the total length, etc., of the mounted bird; however, it was evident that its measurements would be about the minimum usually given for the species. THOMAS L. BOURNE, *Hamburg, N. Y.*

A Late Record for the Red-backed Sandpiper.—While collecting on a small island near Gimli, Lake Winnipeg, Manitoba, June 27, 1916, I secured a finely plumaged Red-backed Sandpiper (*Pelidna alpina sakhalina*). This record hitherto unpublished is interesting because of the appearance of this arctic species at a point only fifty miles north of Winnipeg at a time so late. The individual was an adult male showing no abnormality or sign of recent recovery from injuries and having gonads highly developed. J. NELSON GOWANLOCK, *Hull Zoological Laboratory, University of Chicago, Chicago.*

Sanderling on Nantucket in December.—My son Captain George H. Mackay, Jr., while shooting on December 24, 1920 at Nantucket,

Massachusetts, saw four Sanderlings, which were feeding on the beach. He approached within twenty yards of them before they flew. This is a second winter record as I made another some years ago which was recorded in 'The Auk' at the time.—GEO. H. MACKAY, *Boston, Mass.*

A Very Late Record of the Passenger Pigeon (Ectopistes migratorius).—A mounted specimen of the Passenger Pigeon acquired by the late F. S. Daggett, in January, 1920, and now in the Daggett Collection, deposited in this Museum, bears the following label: "Passenger Pigeon, ♂, No. 315, Coll. of Geo. S. Hamlin. Shot by a Swede, North Bridgeport, Fairfield Co., Conn., Aug., 1906."

The specimen is in fine plumage, but atrociously mounted, with spread wings.

This is apparently one of the latest records of the species, but in some manner it has hitherto failed to receive attention and publication.—L. E. WYMAN, *Museum of History, Science and Art, Los Angeles, Calif.*

Three-toed Woodpecker in Michigan.—While on a hunting trip in Marquette County, Michigan, in the latter part of October, 1920, I was fortunate enough to secure a specimen of the Three-toed Woodpecker (*Picoides americanus americanus*). The bird was taken on the afternoon of October 18 at the southwestern end of Conway Lake, about a mile from the shore of Lake Superior and two miles from the Post Office of Huron Mountain.

The note of this woodpecker first attracted my attention to it and revealed its presence almost at the top of a very tall, dead tamarack. Its call note, which I mistook for that of the Arctic Three-toed Woodpecker, suggested very strongly the "squeak" of some small animal, and lacked the almost mechanical harshness of the note commonly uttered by Hairy and Downy Woodpeckers.

Speaking of the occurrence of this species in the state, Professor Barrows says (Michigan Bird Life, 1912, pp. 749–750)—"we are unable to find any record which can be authenticated." Mr. Norman A. Wood ('Auk,' Vol. XXX, p. 272) reports the finding of a specimen in a collection of mounted birds in the High School at Sault Ste. Marie, labeled "Soo, October 1, 1910; C. E. Richmond, collector.", and it seems a fair assumption that it was taken on the Michigan side of the Saint Mary's River. I have been unable to find, and Professor Barrows writes me that he does not know of, any other record of the taking of this species in the state.

The occurrence of *Picoides americanus americanus* so near the center of the south shore of Lake Superior suggests the possibility of its occurrence in the pine woods at other places south of the lake, though this region is not included in its range as given in the 'A. O. U. Check-List.' It does not seem probable that a non-migratory bird like this woodpecker would reach Marquette County from its normal range by crossing the lake, although the route via Isle Royal and Keweenaw Point would only require

a sustained flight of approximately forty miles. STEPHEN S. GREGORY JR., *456 Surf St., Chicago, Ill.*

A Crowd of Hummers.—On May 1, 1920, after I had returned from a remarkable field trip, on which I had found 94 species of birds, one of my neighbors, Colonel B. F. Procter, called me to see the Ruby-throated Hummingbirds about a red-flowered horse-chestnut on his lawn. There was a continuous going and coming of the hummers, twenty or more being in sight all the time. I saw several perched on the smaller twigs of the tree, in addition to the group buzzing about the fragrant blossoms. Though these tiny birds came every day for a week, I never again saw so many at one time. I feel sure that I saw on that one day more individuals of this species than I have ever seen in any other whole season. This bird is usually so rare that I keep a record of every individual seen.—GORDON WILSON, *Bowling Green, Kentucky.*

Plumage of the Chimney Swift.—Dr. Wetmore's interesting article on the wing claws of *Chaetura pelagica*, in the December 'Condor,' reminded me of another curious fact regarding this bird.

In May, 1898, I put up a lot of skins of Chimney Swifts which had been suffocated in a chimney at Waukegan, Ill., and found concealed among the feathers of the abdomen at about the middle, a tuft of pure white down. This could only be noticed on parting the feathers, and was present in all of them but was lost or absorbed in making up the skins. Last Spring, while preparing a specimen (with the wings spread) my attention was called to a tract of naked black skin on the underside of the wing joint, and upon closer inspection, I found a single smoky black oval shaped feather growing from the center of the naked skin.

Upon examining a number of other specimens of *Chaetura pelagica*, and of *C. vauxi* from California and *C. caudacuta* from New South Wales and Japan, the single feather was also found.—HENRY K. COALE, *Highland Park, Ill.*

Mortality among Chimney Swifts.—In 'The Auk', Vol. XXV, No. 3, pp. 317–318, July, 1908, under the heading "Curious fatality among Chimney Swifts," Mr. Ruthven Deane has recorded that some 700 Chimney Swifts (*Chaetura pelagica*) entered a chimney in the house of Dr. Maxson, Waukegan, Ill., during a heavy rainstorm, while gases from a furnace fire were passing off through the chimney. More than 100 of these birds were killed, and the rest were released while yet alive by the occupants of the house. In another chimney of the same house no Swifts were found at that time.

A destruction of Chimney Swifts in even greater numbers, at Truro, Nova Scotia, under circumstances similar, yet different, is described in the following extract from a letter dated June 1, 1919, addressed to me by Mr. E. C. Allen, now of Halifax, Nova Scotia, to whom I am indebted for permission to publish this note.

"We have had a week of dark and sometimes rainy weather, with strong, very cold north winds during the last half. Yesterday and the day before I noticed an occasional Chimney Swift beating up against the wind toward the First Presbyterian Church, in the large flues of which hundreds of them congregate. This morning I found a dead one on the steps of the Normal Science Building, and a few minutes later another was brought to me. Then I began to suspect trouble, and, after getting permission, visited the church. Twenty-two were picked up on the grounds, though, I was told, several had been carried off. Probably several will reach me tomorrow. Several others were reported about town. Then I went to the basement. There are really four flues. The furnace pipe enters one of these. From the opening at the base of this I took out 1175 dead and nearly dead, and approximately 100 living birds that could fly. Of the other three flues, one contained none, another about a dozen, and the third two dozen.

Now I had taken it for granted that the cause of the tragedy was starvation, as the birds feed entirely on the wing, and few or no insects have been flying this week. The janitor's theory was that the fire built this morning (the first for two weeks) had killed them, and I must say that the location of the greater part of the dead birds seems to substantiate his theory. But what of the others in the other two flues and about the grounds and town? Driven out by heat and smoke and died of cold perhaps. Or could it be that they all or nearly all sought the warm chimney this morning and succumbed to starvation?"

In a letter Mr. Allen informed me that he had examined the alimentary canals of several of the dead Swifts, and had found them entirely empty. HARRISON F. LEWIS, *Bergerville, P. Q.*

An Attack on Live Stock by Magpies (Pica pica hudsonia).—Last autumn, my friend, Mr. H. S. Betts of the Forest Service, Washington, D. C., visited the ranch of Mr. Keith Smith at Linwood, Utah. While in Madison, Mr. Betts stated that Magpies had attacked the sheep, and injured one so badly that it had to be killed. A request for detailed information, brought from Mr. Smith the following letter:

Linwood, Utah,
October 25, 1920.

"Dear Mr. Schorger:

"Referring to letter of the 16th inst., it is only in the past two years that the magpies have injured my rams and I have not heard of anyone else's stock being molested.

"Answering your questions:

"1. The wounds were always in the back, the magpie sitting there and pecking until it had opened up a small hole in the flesh. This got deeper and deeper until in one case the entrails of the ram were exposed.

2. The sheep were not wounded previous to the attack.

3. The magpies worked one at a time.

4. It is a rare occurrence as far as I know. They opened up sores on about ten out of sixty or seventy rams in the past two years.

5. They acted in a similar manner to two or three old thin cows last spring.

We treated the wounds with creolin and pine tar and tried to shoot and poison the magpies.

Yours very truly,
Keith Smith."

It is well known that Magpies are reputed to peck at sores on stock, but in this case uninjured sheep appear to have been attacked, and in one case, at least, severely. The point of greatest interest is the possible acquirement by the Magpie of the pernicious habit of the Kea Parrot.

Dr. H. C. Oberholser has kindly informed me that he is not aware of a similar occurrence.—A. W. SCHORGER, *Madison, Wisconsin.*

Strange behavior of a Bullock's Oriole.—In the early summer of 1920, a young lady, living near me, in eastern Oregon, picked up a young Bullock's Oriole, that had fallen from the nest. Though some time would have elapsed before the youngster would have begun its education under the care of its parents, there was no difficulty in rearing the bird, which soon became a recognized member of the family having the full liberty of the house. When it was several months old and had never exhibited the slightest fear of any human being, the family was surprised by its showing absolute terror, whenever its mistress entered the room dressed in a new dress, which had never been worn before in the presence of the bird. This seemed unreasonable, since it would fly for protection to any member of the family or even to strangers. After this fear had been several times exhibited and was evidently not to be treated lightly, it was suggested that a string of dark beads, which had until then been worn with the dress, might be responsible. When these were discarded the bird at once became normal and permitted its mistress the former liberties.

The sight of the beads, even if partly covered, on a dressing table, would always cause a panic. It is quite probable that the bird mistook them for a snake, in which case its fear was purely instinctive as no snake experience had ever entered the life of the youngster.—A. W. ANTHONY, *Natural History Museum, Balboa Park, San Diego, Calif.*

Domesticated Ipswich Sparrows (Passerculus princeps).—On December 26, 1920, four friends and I visited Duxbury Beach, south of Boston, Mass. As we approached one of the gunners' "blinds," which is occupied all through the shooting season, we flushed two Ipswich Sparrows. These flew a short distance toward the blind and dropped into the beach grass. We soon overtook and flushed them again. This performance was repeated several times, until finally the birds dropped upon the nearly bare sand close to the blind and on the edge of the group of tethered

ducks and geese belonging to the gunners. Here we were able to approach the sparrows close enough to observe them well without a glass. Later, one of the birds sat in plain sight on a beach plum bush for fully five minutes, allowing us to study him thoroughly from various angles. We were astonished at this behavior in a bird with so well earned a reputation for secretiveness and elusiveness. The explanation was, however, forthcoming. The gunners told us that these two sparrows came every day and fed among their captive fowl. In this way, apparently, they had come to be quite reconciled to "neighboring" with humans, indeed thought nothing of it!—HELEN GRANGER WHITTLE. *Cambridge, Mass.*

The Green-tailed Towhee (Oberholseria chlorura) on the coast of South Carolina.—On the afternoon of January 18, 1921, I went to the beach to see whether the Whistling Swan had come back to the place where I had seen it the previous afternoon, but instead of seeing it I saw a bird in my yard with a chestnut crown patch feeding in a thicket of lavender bushes near high water mark and which, at first glance, I took to be a Swamp Sparrow. As I had yet to see a Swamp Sparrow in *winter* plumage with a well marked chestnut crown patch, and as the bird at a distance looked much larger than a Swamp Sparrow, I lost no time watching it but went hurriedly to my house for my gun. Upon coming back to the place where I had last seen it I found this strange bird in an adjacent lot and shot it. Upon securing it I was amazed to find that I had taken a Green-tailed Towhee—a bird of the far western states. The specimen is an adult male in fine plumage and was very obese. This bird must have arrived in my yard sometime in November, 1920, as the migration of the Fringillidae is over before the last of that month.

The capture of this Green-tailed Towhee makes the sixteenth far western bird and the forty-fourth species that I have added to the fauna of South Carolina.

There is a Virginia record of this Towhee by Mr. G. C. Embody ('Auk,' XXV, 1908, 224) of a bird taken near Portsmouth on January 26, 1908, by Mr. John B. Lewis and in the collection of Mr. Embody. To what extent the list of South Carolina birds can be increased by the capture of far western birds there can be no conjecture.—ARTHUR T. WAYNE, *Mount Pleasant, S. C.*

The Bohemian Waxwing in Iowa in Vast Numbers.—An article, showing such thorough investigation as does that one entitled "Bohemian Waxwings in New England" by the late Horace W. Wright, which was published in 'The Auk' for January, 1921, is certain to prompt reminiscence and review. Some of us recall the days when we, too, entertained the Bohemian Waxwing (*Bombycila garrula*) about our homes. Mr. Wright's article shows that the winter of 1908–1909 was a banner season for this species in the New England states, and a review of the literature on the subject reveals references to the appearance of this Waxwing in most of

the states in the northern tier from Washington to Maine, as well as in the Canadian provinces. Another fact, brought to light by this review, is that Montana is the only state from which the Bohemian Waxwing is reported regularly in the Christmas Bird Census.

It was in the winter of 1908–1909 that the most notable visit to Clayton County, Iowa, was made by this Waxwing. It was reported to have been seen in small flocks in several places. Most of my observations on these birds were made in our own dooryard or that of our nearest neighbor, where stood a mountain ash tree, loaded with berries. These observations were similar to those that have been published by others, therefore will not be repeated. But there was one feature of this visit quite out of the ordinary: On December 29, 1908, the day the Bohemian Waxwings arrived, a vast flock of birds was seen by two observers at points a half mile apart, and as there was a difference of about an hour in the time of the two observations there may have been two flocks or the first flock may have divided into smaller flocks. The first observer was Mr. Jerome Jones, who stated that soon after daylight a vast flock of birds flew over his head, "millions of them" he estimated; that they covered the sky and were several minutes in passing. When a boy, he had an interest in birds above the average, and is a man careful in his statements. The other observer was Mrs. D. A. Wright, whose description of the flock was written down soon after it passed and was substantially as follows: About eight o'clock in the morning she saw a flock, containing thousands of birds, fly northeast. They flew as closely together as birds ever do and covered a space from two hundred to three hundred feet in width and were two or three minutes in passing. She believed they were Bohemian Waxwings, nine of which for the following eighteen days frequented her mountain ash tree.

There seems to be no other species to which to assign the birds of this great flock. In corroboration of this conclusion we have this quotation "Professor Baird mentioned that Mr. Drexler saw 'millions' on Powder River, (Montana) in flocks rivalling in extent those of the Wild Pigeon." This is quoted in 'The Auk' for January, 1908, by E. S. Cameron in his account of the vast numbers of Bohemian Waxwings that visit Montana in winter. Again in 'The Auk' for October, 1917, Willoughby P. Lowe writes of this Waxwing: "The enormous quantities that visit Pueblo Co. [Colorado] during some winters is astonishing, densely packed flocks two miles long and a quarter of a mile wide occur. When a Pigeon Hawk dashes into their midst the sound of their wings must be heard to be appreaciated."—Althea R. Sherman, *National, via McGregor, Iowa.*

The Loggerhead Shrike (Lanius ludovicianus ludovicianus) seen Killing a Large Bird.—On December 17, 1920, while hunting in a teepelo swamp near my house I saw a Loggerhead of normal size attack and kill, a very large Phœbe (*Sayornis phœbe*). The attack was so quickly made that the Phœbe was dead before I could stop the Shrike.

I then waited for the Shrike to return, which it did almost at once, and struggled hard to carry its victim in its *claws*. It dropped it twice before finally carrying it to a thick-leaved live oak tree in the swamp. I then made the Shrike drop its prey and found that the bird was killed by the *claws* of the Shrike in the interscapular region. This Phœbe was a very large one measuring 7.5 inches in length and was very fat. Never before in all my experience have I seen a Loggerhead kill so large a bird. In the winter in South Carolina many Palm Warblers (*Dendroica palmarum palmarum*) fall victims to these hawk-like birds.—ARTHUR T. WAYNE, *Mount Pleasant, S. C.*

Orange-crowned Warbler in Boston in Midwinter.—On December 28, 1920, in the Arnold Arboretum, Boston, Mass., my husband and I found two Orange-crowned Warblers (*Vermivora celata celata*) feeding with five or six Chickadees. The birds kept in rather low, leafless shrubbery most of the half hour we had them under observation, but at times both Chickadees and Orange-crowns fed upon something found in the thick clusters of dried leaves hanging upon the white oaks. We were especially interested to find two of the warblers together, as most of the records for our section seem to be for single birds.—HELEN GRANGER WHITTLE, *Cambridge, Mass.*

The Proper Name of the Pine Warbler.—The confusion of the Pine and Blue-winged Warblers by the early writers, owing to the poor quality of Catesby's plate of the former, is well known, as is also the fact that Linnaeus, who never saw either species, supposed when he published the name *Certhia pinus* that he was naming the Pine Creeper of Catesby, whereas his description, taken from Edwards, was based upon the Blue-wing. His name *pinus* has therefore, very properly, always been applied to this lafter species.

Alexander Wilson in 1811 untangled the confusion and clearly separated Catesby's Pine Creeper which he called *Sylvia pinus*, his specific name being current for seventy-five years. Then, in 'The Auk' for 1885, p. 343, Dr. L. Stejneger reviewed the subject stating that Wilson "well aware of the term *Sylvia pinus* did not intend it as a new name, but simply restricted it to Catesby's bird." He therefore proposed to drop Wilson's name and adopt *vigorsi* of Audubon.

Only two authors actually used the term "*Sylvia pinus*" prior to Wilson and these were Latham and Vieillot who were simply transferring Linnaeus' "*Certhia pinus*" to the genus to which, at that time, it belonged.

Now Wilson may have intended to "restrict" the earlier name but it is much more likely that he intended to name Catesby's bird "*Sylvia pinus*," regardless of what anyone else had done, and that is precisely what he did. As he nowhere mentions *Certhia pinus* Linn. nor *Sylvia pinus* Lath., and had never seen Vieillot's work, it does not seem that we have any right to infer that he meant to do anything beyond what he actually did,

and as the validity of *Sylvia pinus* Wilson is not affected by the earlier *Certhia pinus* Linn. nor by *Sylvia pinus* Lath., a mere reference of the former to the genus *Sylvia*, the Pine Warbler should revert to its old name of *pinus* and be known as *Dendroica pinus* (Wils.).—WITMER STONE, *Academy Natural Sciences, Philadelphia.*

Hooded Warbler (Wilsonia citrina) on Belle Isle, Detroit, Mich.—On page 463 of 'The Auk,' for 1920 there is a note by Bradshaw H. Swales recording a Hooded Warbler (*Wilsonia citrina*) seen by him on Belle Isle, May 6, 1920.

Strange as it may seem I probably saw the same warbler on that date as my report to the Biological Survey will disclose. I saw the bird first about 8 A. M. and watched it for some time. It was in low bushes on the edge of a road bordering one of the canals. It would drop down to the ground, then up to the low bush again, constantly uttering its fine, high "chip" note and nervously flitting about in such a manner as to show the extensive white on the tail. Finally I walked on through the woods but when I returned to the same locality an hour or so later the bird, a lovely male in full plumage, was still in the immediate vicinity. I sat down and watched him again for some time and knew that there was no mistake in the identification as I had seen and studied many of this species while living in Indianapolis, Indiana, where the bird is fairly common.—ETTA S. WILSON, *Detroit, Mich.*

Some Records of Breeding Birds for the Vicinity of Washington, D. C.—During the many years of collecting oological material in the marshes along the Potomac River on the District of Columbia boundary line and vicinity, I have personally collected nests and eggs of the following species, which have never been recorded.

Rallus virginianus. VIRGINIA RAIL.—While collecting with my son Edward E. Court, June 3, 1917, we found two nests of this species, containing 7 and 11 eggs respectively, in the marshes just back of Jackson City. The nests were built among the cat-tails about six inches above high water, and composed of reeds, lily stems and marsh grass. In both cases the eggs were heavily incubated, but made perfect specimens. There were other pairs nesting as we heard birds at several other places in the marsh.

The eggs were all uniform in color, a light cream-white, spotted mostly at the large ends, with reddish-brown and with faint markings of lavender.

The whole time we were in this part of the marsh the birds were within twenty feet of us.

Rallus elegans. KING RAIL.—Reported by Dr. Chas. W. Richmond and Mr. S. S. Dickey, Pennsylvania, as nesting here. This season Mr. Ernest A. Sikken, Hyattsville, Maryland, and myself found a set of eleven eggs in the marshes back of Jackson City, Virginia. This set is in the Sikken collection. The eggs were incubated about five days. This is one of the rarest of the nesting species in this locality.

Gallinula galeata. FLORIDA GALLINULE.—We collected a set of seven eggs June 3, 1917, and one of eight May 30, 1919. Both sets were started in incubation about five days. The first nest was placed on the top of a large bunch of marsh grass, poorly constructed of lily stems and reeds. This set is very handsomely marked, and all the eggs are evenly spotted with pale buff and deep reddish-brown and chestnut.

The second set had a lighter back ground. Birds were not seen but were heard.

Botaurus lentiginosus. AMERICAN BITTERN.—On June 3, 1917 we found three nests of this species. The first had three young ready to fly, the second three young ten days old, while the third contained four hard set eggs which I took. This nest was a rather large platform of reeds about a foot above the water. The female flushed when I was within three feet of her.

Eggs shining brownish-drab.

Bubo virginianus virginianus. GREAT HORNED OWL.—A set of three eggs was taken by my friends Robert Bains and Rowland J. Booth. This is the first set ever taken in the District of Columbia. The bird had nested in a large sycamore tree on the edge of Rock Creek from which the female was flushed. Eggs three, incubation far advanced in early March, 1920. This set is in the collection of Mr. Rowland T. Booth, Silver Springs, Maryland.

Antrostomus carolinensis. CHUCK-WILL'S-WIDOW.—While collecting in St. Marys County, Maryland, May 10, I was fortunate to find a set of this species. This is the first set taken in this county. The two eggs were somewhat incubated and I have them in my collection. Just across the river in Northampton County, Virginia, they are rather plentiful and I have heard several calling at once and many times flushed birds going through the wilder country toward Smith Point light house.—EDW. J. COURT, *Washington, D. C.*

Sturnus vulgaris. EUROPEAN STARLING.—This species has made its way down here and in 1920 I found them nesting on April 20 on Bladgens Hills. Six pairs nested in a grove of maples and I secured a nest and five eggs. I also found them nesting in deserted nests of the Red-headed Woodpecker, *Melanerpes erythrocephalus*, at Brookland, D. C., and a small colony at College Park, Prince George County, Maryland.

Rare Records for Ann Arbor and the State of Michigan.

Tyto pratincola. BARN OWL.—This species is becoming more common each year. The first set of eggs taken in the state was given to the Museum of Zoology by the collector, Mr. Walter E. Hastings of South Lyon, Oakland County. The nest was found April 8, 1916, in an enlarged nest of the Flicker. It was built in an old maple tree about four miles northeast of South Lyon, and about forty feet from the ground.

Archibuteo lagopus sancti-johannis. ROUGH-LEGGED HAWK.—This migrant is rarely seen here, but one was taken at Portage Lake, about

sixteen miles northwest of Ann Arbor, on November 27, 1920, by Earl Haynes.

Picoides arcticus. Arctic Three-toed Woodpecker.—This is a very rare straggler from the north of Michigan and we have only one previous authentic record for this vicinity, October 18, 1884 by M. L. Eaton. A fine male was taken November 7, 1920, near South Lyon, Oakland County, by Fred L. Giddings and given to the museum collection. On December 6 three others were seen by Walter Hastings, also of South Lyon.

Cryptoglaux acadica. Saw-whet Owl.—On January 1, 1921 a fine immature male was taken in a small tamarack swamp near Pleasant Lake, Freedom Township. This species is a rare visitant here in winter, and we have but one breeding record. The above specimen was donated to the museum by the collector, Mr. E. J. Lohr.

Picoides americanus americanus. American Three-toed Woodpecker.—On January 12, 1921 the Museum received a skin of the female of this species, taken by B. R. Twombly in Gogebic County in December, 1920. This constitutes the second record for the state. The first was taken at Sault Ste. Marie on October 1, 1901; and was mounted for the high school collection of the city by Professor C. E. Richmond. It may prove to be a rare resident of the Upper Peninsula.

Astur atricapillus atricapillus. American Goshawk.—A fine specimen of this rare winter visitant was noted at South Lyon on January 17, 1921 by Mr. Walter E. Hastings.—Norman A. Wood, *Museum of Zoology, University of Michigan, Ann Arbor, Mich.*

The Song Periods of Individual Birds.—During spring and summer of 1920, I started a study of the songs of individual birds, believing that the great difference that exists between the songs of individuals of the same species could be used as a means of tracing the movements of the individuals. This study brought many interesting results, most of which are too incomplete to publish at present. But one result was so unexpected, and has so important a bearing on certain ornithological work being done today, that I believe it should be brought to the attention of others as soon as possible.

The Biological Survey for some time has been collecting data on the numbers of breeding birds in the country, basing counts on the numbers of singing males during the height of the breeding season. In this work it is assumed that during the early morning hours every male bird is in song. No one, so far as I know has ever questioned that this assumption is correct, and I believe that I was one of the first to make it and to use it. ('Auk' XXXI, pp. 200–210). My work this summer has shown me, however, that with a number of species, and perhaps with the great majority, it is not true.

A species such as the Field Sparrow, for example, sings continuously from its arrival in April till the early days of August. This summer, with

a large number of individual Field Sparrows under observation, each distinguished by its location, and by the peculiarities of its song, I did not find a single individual that sang throughout the song period of the species. A great many ceased singing in the latter part of May and were not singing at all in June, in the height of the breeding season. This same condition obtained with the Meadowlark, Vesper Sparrow, Towhee, Yellow-throat and Wood Thrush, among species I had selected for study. In fact there was only one species, the Song Sparrow, of those I studied, where individuals did sing throughout the song period of the species.

From May to August I visited a certain wood almost daily. I found no less than seven male Wood Thrushes residing in that wood, each with its own special preference as to locality, and each with certain peculiarities in the phrases of its song that distinguished it from the others. I studied each song carefully and made graphic records of the phrases of the songs, so that I came to know each bird quite well. During this entire time I never heard more than three thrushes in song in this wood on the same day, even early in the morning. Anyone attempting a count of birds in this area, basing his count on singing males, unless he studied individual songs, would have counted but three pairs of Wood Thrushes.

These facts, if they are true of birds throughout the country, will make the bird counts underestimates so far as certain species are concerned. I suppose there are some who will be skeptical as to my ability to distinguish individual birds by peculiarities in their songs. While I am not ready to go into the detailed proofs and explanations of this work now, I would suggest to the doubter, that if he possess a musical ear, he try it himself. I am convinced that there is much to be learned by a detailed study of bird songs, and more students in this field would be welcome.—Aretas A. Saunders, *48 Longview Ave., Fairfield, Conn.*

Convergent Habits in Fur Seals and Penguins.—In reading Dr. G. Murray Levick's interesting book 'Antarctic Penguins,' I find it impossible to avoid frequent suggestions of parallelism in the habits of the Adelie Penguin and the Fur Seal. These may be of no particular significance but perhaps are of enough interest to be especially noted.

Like the seals, the penguins are amphibious, highly gregarious, and migratory. Unlike them, they are polygamous and this of course involves important differences in habits; but when these are taken into account, the resemblances are still numerous. As is well known, the Fur Seal comes to land only to breed during a short summer season, arriving after a long migration from its winter home in the open sea. The penguin does the same and, no less than the seal, follows its course with the precision of a mariner and his compass and arrives at its destination within a narrow time limit. The male seals precede the females and take up adjacent positions in their rookery and the females later come to them, the males fighting much with each other at this time. With penguins, the sexes arrive together, but unmated, and the female chooses a nesting spot and

clings to it until joined by a male which may be almost immediately or may be delayed for some days. The males fight violently for the possession of individual females and their melees often cause injury to eggs or young. With the seals the case is similar. With both seals and penguins, after domestic relations are well established, there begins a period of excursions to and from feeding areas at sea. During this period much time is spent in playing in the water directly in front of the rookery. The sheer joy shown by fur seals when they return to the water after an enforced stay on land is evidenced also by the penguins which are said to go through many of the same antics as the seals, shaking and rubbing themselves clean, rolling and tumbling about, chasing each other, "porpoising" in small schools and having a general good time. The game of "joy riding" on ice floes, which seems to be a favorite with the penguins, is not possible for the seals, but otherwise their "fun" is much the same. Like mother seals, the penguins remain away from the rookery several days, sometimes nearly a week, while on their fishing excursions. During the interval the temporarily orphaned young await their return collected in groups which may number 50 or more. The pup seals in such groups, or "pods," are left largely to their own devices, although the presence of many adult seals, which are always near them, guarantees them against serious danger. The same result is accomplished by the penguins, but in their case there is perhaps a more definite guardianship of the young by certain of the adults which remain with them. Dr. Levick's account of the way the food-laden, returning mother penguins are successively importuned by various hungry youngsters not their own, and the way these are scornfully repulsed until the rightful one is found, could be applied almost to the letter to the Fur Seal.

Possibly the most interesting parallel in the habits of the two animals is that relating to the enforced fasting. In the seals, this is largely confined to the males, which go without food for six to nine weeks. With the penguins, both sexes fast, but the female does so longer than the male, her minimum being about four weeks. In both cases, the fasting takes place while vital demands are at the peak during a time of great sexual and general physical activity.

Further resemblances, especially those of minor character, are numerous, but these need not be noted.—Wilfred H. Osgood, *Field Museum of Natural History, Chicago, Ill.*

A Bagworm Plague.—When I first came to Bowling Green, Kentucky, in 1908, the great knob now the site of the Western Kentucky State Normal School was covered except for a small space on the summit with a rank cedar thicket, once the rendezvous of bands of outlaws in the unsettled times following the Civil War. This knob and several similar cedar brakes had long been the nesting places of the Bronzed Grackle, the Robin, the Brown Thrasher, the Cardinal, and the Chewink. In winter hundreds of White-throated Sparrows, Golden-crowned Kinglets, and

Purple Finches found food and protection there. Twined about many of the hoary old cedars were rank growths of poison ivy, furnishing food for a host of birds. In the spring of 1912 I found in one day on this hill 75 nests of the Bronzed Grackle. Some trees had as many as ten of these large, bulky nests and literally "you could not hear your ears" when all the birds were talking or gossiping. On one of the snowiest days of the winter of 1916–1917 I found 24 species of birds on this hill in a little over an hour and in the height of the migrating season that spring I saw 52 species there in a single afternoon.

But all this has radically changed, making a bird lover sigh for "the good old days." The bagworms, which had been steadily growing more numerous for several years, took on plague proportions in the summer of 1917. The poorly-nourished trees fought along the best they could through the rest of that summer and until midsummer in 1918, when they began to die rapidly. The whole hill soon looked as if it had been burned over. No other visible enemy except the bagworms could be found and I feel sure that this was the real cause.

Naturally, the hordes of birds came back half-heartedly but it was not particularly attractive to them to place their nests in spots unprotected from the sun or from enemies below. However, a few Bronzed Grackles tried the experiment but scolded more even than usual and seemed thoroughly disgusted with one year's experience. The ground birds also found their secluded places suddenly opened up and sought other nesting-sites. I feel quite fortunate now if I can see anywhere on the knob half as many species as I could see before the death of the cedars. So far as I have been able to observe in the past two years there are not so many Bronzed Grackles or Chewinks in my territory, as a whole, as there were before this plague. Probably the breaking up of their old breeding grounds has made them seek other sections.—Gordon Wilson, *Bowling Green, Ky.*

An Anonymous Work of John Cassin.—Some years ago it was my privilege to read over the correspondence of Professor Spender F. Baird, at the home of his daughter, the late Lucy H. Baird in Philadelphia and copy such portions as I might desire. I was especially interested in the many letters from John Cassin describing his work at the Philadelphia Academy, and the general progress of ornithology in America.

Under date of March 12, 1851, he wrote "Stephens and I are very busy getting up a lot of the greatest nonsense you ever saw, a 'Comic Natural History of the Human Race.' I will send you the second number which will soon be out." He also adds that his contributions to this work are all signed "C."

Knowing that Cassin possessed a keen sense of humor and did not take his science so seriously as to preclude a glimpse at the more frivolous side of life, I have always been curious to see a copy of this work but none ever came to my attention until quite recently.

My friend, Dr. Spencer Trotter, in the course of conversation a few days ago, mentioned a curious book that had been entrusted to him for sale, and upon his showing it to me I at once realized that it was the long sought work of Cassin. It is entitled 'The Comic Natural History of the Human Race; designed and illustrated by Henry L. Stephens, Philadelphia, S. Robinson, No. 9 Sansom Street.' It is Royal, octavo, exactly the same size as Cassin's 'Birds of California and Texas,' and contains 216 pages. There are forty colored plates, drawn by Stephens and lithographed by L. Rosenthal, representing human heads on the bodies of various birds, mammals, fish, etc. Some of these are portraits of individuals, others simply of types. The humorous letter press is by nine named contributors and several anonymous ones. Cassin was the editor as well as the author of six of the sketches, although, without the clue given in the Baird letters, it would be impossible to connect him with the volume, as his name does not appear. To one familiar with his letters, however, his peculiarities of style and wording are at once apparent. Stephens was the artist of certain plates of the U. S. Exploring Expedition reports and probably of some of the Government surveys.

This curious volume has no ornithological interest except in connection with Cassin, but that seems to be sufficient excuse for placing on record the facts that I possess in relation to it.—Witmer Stone, *Academy of Natural Sciences, Philadelphia.*

Correction.—In recording the occurrence of the American Egret at Scarborough, Maine, ('Auk,' XXXVIII, p. 109, January, 1921) the date of capture was, through error, omitted. The specimen was shot July 18, 1920.—Ruthven Deane, *Chicago, Ill.*

RECENT LITERATURE

Howard's 'Territory in Bird Life.'—Those who have read Mr. Howard's work on the British Warblers will recall the attention that he gave to the origin and development of various activities connected with reproduction, and the ingenious and suggestive theories and explanations that he presented in this connection. The present volume[1] carries out many of these theories on broader lines linking together various phases of sexual behavior, song and migration under the general impulse of reproduction.

Mr. Howard has produced an intensely interesting volume and while he does not pretend to have sifted the matter to the bottom and while we may think of many exceptions to some of his theories, he has nevertheless presented a mass of observations and clever explanation which will serve as food for thought and demand the careful attention of everyone interested in the study of bird behaviour.

Our author's investigations have led him to regard the establishment of a definite "territory" or domain by each breeding male, as the key note to the whole subject. First there is an organic change which stimulates the male to isolate himself from the flock, involving more or less of a migration; then there is the finding of an environment appropriate for purposes of reproduction, in which the male establishes himself, fighting off any rivals that come within his domain; and finally the arrival of a female with which he mates and together they defend their territory and accomplish the duties of reproduction. It follows, as the author admits, that upon his theory the discovery of a mate rests largely upon the female which reverses the accepted order or procedure. "But after all" he says "what reason is there to suppose that the male seeks the female or that a mutual search takes place; what reason to think that this part of the process is subject to no control except such as may be supposed by the laws of chance?"

The male, he goes on to show, cannot leave his "territory" without danger of its usurpation and as rapidity of mating is essential, some guidance to the female is necessary and here is where song comes in. Male birds rarely sing, especially with full vigor, until established in their "territory" and hence the fully developed song is always an advertisement of a male ready for mating. If singing began before the territory was selected the female would be attracted by a male not yet at the stage for mating, and reproduction would in such case be delayed. It of course not infrequently happens that two females are attracted by the same male and then follows a physical combat just as occurs between males

[1] Territory in Bird Life. By H. Eliot Howard, with Illustrations by G. E. Lodge and H. Grönvold. London, John Murray, Albemarle Street, W. 1920. 8vo pp. i–xiii—1–308, 11 photogravure plates. Price 21 shillings net.

when they are establishing the boundaries of their respective "territories." Later on paired males will fight when one enters the "territory" of the other or one male and female will unite in the defence of their domain against a neighboring pair, or a male will drive out an encroaching female or vice versa. Only this theory of an established "territory" as the primary cause of conflict can, in the author's opinion, explain the complicated nature of the fighting that is to be seen every season and in every community. Furthermore neutral grounds may be recognized, unsuited perhaps for nesting, but rich in food supply, where various males as well as females will resort in perfect harmony, just as in the winter flockings, although the very same individuals will engage in strenuous combat if they encounter one another within the confines of their respective "territories." Within each "territory" there is a favorite perch from which the male sings and which Mr. Howard terms the "headquarters." This is the station which Mr. H. Mousley has so fully described as the "singing tree" in his paper in 'The Auk' for 1919, p. 339—to which paper by the way our author makes no reference.

The delimitation of the "territory" is accomplished as a result of habit, in visiting certain particular spots or perches, over and over again, in search of food or for other purposes, and while fairly definite the boundaries are of course not absolute.

The need of a "territory," Mr. Howard thinks, lies in the necessity of the parents' securing sufficient food for their young without going so far from the nest as to deprive them of brooding for too long an interval, and he dwells particularly upon the extreme delicacy of young passerine birds and the need of continual protection from cold by brooding.

In other words each nest is by this plan provided with a sufficient food supply immediately around it, which would not be the case were there a community of nests close together. As birds of other species do nest close by and have "territories" of their own with different boundaries, we must naturally suppose that their food is of a different character. No doubt some of our economic ornithologists could furnish data of the greatest interest in this connection and demonstrate why certain species can live in close proximity without affecting each other's food supply.

There are of course species in which many pairs nest in close association. Many of these, as the Guillemots, Mr. Howard considers, represent cases where the question of securing food is subordinate to the question of securing a station suitable for reproduction. With the Guillemots the nearby ocean always provides an abundant food supply, but the narrow rock ledges have to be divided into the smallest possible "territories" to provide nesting space for all and maintain the existence of the species. The cases of community nesting as in swallows may be explained in somewhat the same way or may, as it certainly does in the case of Rooks, involve the factor of mutual protection.

While the "territory" theory is the dominant theme of Mr. Howard's book he has much to say on other topics more or less related to it. In

connection with song he emphasizes the absolute necessity for a "specific" character in the song of every individual of a given species if it is to serve as a guide to the female of that species in finding a mate. This is I think a statement with which all students of bird song will agree, for while the keen ear may be able to recognize a number of *individual* songs in any species, they all have the specific quality so developed that there is never a question as to what *species* is singing. We fail, however, to harmonize with this Mr. Howard's claim of mimicry in so many British birds as the Jay, Wood Owl, Red-backed Shrike, and various Warblers. Surely there is no such wide-spread mocking among American birds and we are led to wonder whether many cases of alleged mimicry are not mere fancied resemblances. If mimicry exists to such an extent it would seem to be a serious hindrance to the development of a specific song.

In Mr. Howard's discussion of migration he makes no mention of Dr. Watson's experiments with the Terns of the Dry Tortugas and in other connections seems to be quite unacquainted with the American literature bearing upon his subject. Americans however cannot afford to remain ignorant of Mr. Howard's interesting work—interesting alike to the student engaged in research along similar lines and to the general reader who appreciates a fascinating discussion of some of the deeper problems of ornithology.

The beautifully drawn plates represent spirited contests between individuals of various species of British birds, a phase of bird behaviour which takes on a great deal of interest in connection with Mr. Howard's theory and which seems to have been much neglected and but poorly understood in the past.—W. S.

Saunders' 'Distributional List of the Birds of Montana.'—In this admirable publication[1] Mr. Saunders presents us with the first comprehensive list of the birds of Montana and at once places the ornithology of the state on a firm foundation. His list is up to date in every respect, consisting of an introduction, a discussion of distributional areas in which life zones and forest associations and their characteristic birds are considered; a fully annotated list of 332 species (with additional lists of extinct, introduced and hypothetical species) and a bibliography.

In the introduction he apologizes for the fact that the present list cannot compare in completeness with those of most of the other western states because there are as yet scarcely any resident ornithologists in Montana, little collecting has been done, and there are almost no series of specimens, while for many sections scarcely any data are available. It may however

[1] A Distributional List of the Birds of Montana, with Notes on the Migration and Nesting of the Better Known Species. By Aretas A. Saunders. Pacific Coast Avifauna Number 14. Cooper Ornithological Club, Berkeley, California. Published by the Club, February 1, 1921. pp. 1–194 and 35 text figures. Price $6.00, for sale by W. Lee Chambers, Business Manager, Eagle Rock, Los Angeles Co., California.

prove fortunate that an ornithologist of Mr. Saunders' ability has made a review of the subject at such a comparatively early date, as he has no doubt been able to settle many matters that would have been impossible of solution a few years later, while such an accurate work as this will prevent many an error by those who write upon the birds of the state in the future.

While Mr. Saunders has given us all that can be expected in a "distributional list" we regret that he did not have the opportunity to add biographies of at least some of the species which he lists, as the delightful paragraph which closes his introduction shows that he is quite capable of furnishing this much more difficult sort of ornithological contribution. He has evidently had experiences too, which his successors will hardly be privileged to enjoy in view of the rapid settlement of the state today. He says in speaking of the pleasure of living over in retrospect the experiences recorded in his notes: "I have seen again the rolling prairies on a bright June morning, with countless McCown Longspurs, rising into the air and parachuting down again into the grass, or a male Curlew, charging with loud protest toward the man who had ventured near his nest. I have seen the prairie ponds, dotted with ducks of many species, with pink and white Avosets wading about the muddy shores, and Coots and Grebes swimming among the tules that border the farther side. On the same prairies, bleak with the winter snow and cold I remember the whirling flocks of Snow Buntings, Horned Larks and Rosy Finches or a single Snowy Owl, sitting on a rise of ground, and flying silently away at my approach. The ever changing mountains have been pictured in my memory; the wonderful little Dipper, diving under a waterfall and emerging to sit on a wet stone and sing, the friendly Rocky Mountain Jays, who came at the noon hour to share my lunch in the pine forest, the cock Franklin Grouse, sitting in a dark green spruce top, opening and closing the red comb over his eye, the Solitaire rising in flight song above the mountain peaks, his voice ringing loudly and melodiously through the clear air; and the sweet evening chant of the White-crowned Sparrow in the willows near our camp by the lake shore. However scientifically "cut and dried" the text of this list may seem, back of it is a living Montana, teeming with interesting and wonderful bird life, worthy of greater attention from the future ornithologist."

Few states show such a diversity of physical conditions as Montana and the bird life varies accordingly from the Upper Sonoran and Transition prairie districts of the east to the Canadian, Hudsonian and Arctic Alpine mountain districts of the western counties. Already Mr. Saunders has found it difficult to accurately locate records of the older publications dealing with Montana birds, so rapidly are names changing as settlement advances and new towns and counties are created. Many of these would doubtless have entirely lost their significance had he not placed them while it was still possible to do so.

The illustrations consist of an outline map of the state and a number of half-tones of scenery, birds and nests from photographs of Mr. A. D. DuBois and the author, some of these having appeared previously in 'The Auk,' although the fact is not mentioned.

The author is to be congratulated in sticking to the nomenclature of the 'A. O. U. Check-List,' except in some emendations to common names. The insertion of every proposed innovation in nomenclature in a work of this kind serves no purpose but to confuse the reader and detract from the value of the publication.

Both the author and the Cooper Club are to be congratulated upon the appearance of this notable addition to the well known series of which it forms a part.—W. S.

Hartert on the Types in the Tring Museum.—In November, 1918, Dr. Ernst Hartert published a list of the types of birds in the Brehm Collection in the Tring Museum, which was followed in 1919 by the first instalment of a catalogue of the types in the general collection, covering the Corvidae to the Meliphagidae. The second instalment[1] is now before us carrying the list from the Nectariniidae through the Troglodytidae.

Some idea of the size and importance of the Tring Collection may be gathered from the fact that this list, so far, includes no less than 878 types. Most of the types are of species described by Lord Rothschild and Dr. Hartert although there are a number of other authors. In the course of his work Dr. Hartert has had occasion to name several new forms which appear in this list for the first time: *Cinnyris alinae vulcanorum* (p. 426) Kivu, Urwald; *C. souimanga apolis* (p. 428) Madagascar; *Zosterops intermedia periplecta* (p. 434) Lombok; *Pelicinius zeylonus phanus* (p. 451) Farta Bay, W. Africa; *Prinia mistacea graueri* (p. 457) near Baraka, Africa; *Sylvietta leucophrys chloronota* (p. 460) Baraka, Africa; *Cisticola tinniens perpulla* (p. 466) Benguella; *Turdus obsoletus parambanus* (p. 475) Paramba, Ecuador; *T. fumigatus caparo* (p. 475) Trinidad; *Cyornis banyumas peromissa* (p. 491) Selayer, south of Celebes; *Rhipidura rufiventris tiandu* (p. 497) Taam Island, Tiandu Group.—W.S.

Gurney's 'Early Annals of Ornithology.'—In this volume[2] Mr. Gurney has collected a mass of data concerning the earliest published accounts of birds, with exact quotations from the texts and reproductions of a number of the most interesting drawings. Beginning with the prehistoric bird pictures in the Spanish caves he traces the development of

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[1] Types of Birds in the Tring Museum. By Ernst Hartert, Ph.D. B. Types in the General Collection. (Continued from Novitates Zoologicae, 1919, p. 178.) (Novitates Zoologicae XXVII, pp. 425–505. November, 1920.)

[2] Early Annals of Ornithology. By J. H. Gurney, F. Z. S., Author of "The Gannet, A Bird with a History," "A Catalogue of the Birds of Prey, *Accipitres* and *Striges*," etc., with illustrations from photographs and old prints. H. F. & G. Witherby, 326 High Holborn, London, 1921. 8 vo. pp. 1–240. 12 shillings, 6 pence net.

ornithology century by century down to the time of Linnaeus, Pennant and Latham.

Prior to the tenth century we have only scattered mention of birds in old Saxon verses, where the Gannet, Kite, Goshawk and Raven appear. For several centuries however the birds most frequently menticned in literature were the domestic fowl and other birds used for food, and rapacious species employed in falconry, which practice is said to have dated back to 1700 B. C. in Persia and even earlier in China. Pheasant hunting is mentioned in the Welsh laws of the tenth century, and in the fifteenth century laws were passed to check the ravages of Rooks. The Venetian ambassador in 1496 was astonished at the abundance of bird life in England and reports that one or two thousand tame swans could be seen at once on the Thames. Swan laws and the marking of the bills of swans to denote ownership come in for much attention a little later.

In the sixteenth century there is an interesting housekeeping record of birds brought to Hunstanton Hall, Norfolk and several early price lists of birds, show at what a ridiculously low cost they could be purchased. A swan in the fourteenth century brought four shillings, a snipe a penny, while four larks could be had for the same price, and a teal for two pence.

Details of the great feast, when Neville the Chancellor of England was made Archbishop of York indicate what a place birds played in the menu of the fifteenth century. The program called for 4,000 Mallard and Teal, 2,000 Geese, 400 Swan, 400 Plover, 104 Peacocks, etc., sixteen species of birds being enumerated.

In the sixteenth and seventeenth centuries we find the first writers who could be considered "ornithologists," while the first list of English birds is that of Christopher Merrett, 1666, a poor effort at best, which was followed in 1676 by the famous 'Ornithologia' of Willughby and Ray.

Space will not permit a more detailed review of Mr. Gurney's book but to those who are interested in early bird lore and in tracing the origin of domestic fowl and the former status in England of many birds now rare, will find a perusal of his pages intensely interesting. A good index serves as a clue to the voluminous and diverse information which the book contains.—W. S.

Swarth's 'Birds of the Papago Saguaro.'—This National Monument lying just east of Phoenix, Arizona, is a tract of land set aside for the conservation of the peculiar desert vegetation of the region, which is so rapidly disappearing before the advance of cultivation. Connected with it by the Apache trail are the Tonto National Monument and the Roosevelt Bird Reservation some eighty miles farther east. The purpose of the present pamphlet,[1] gotten out by the National Park service, is to present

[1] Birds of the Papago Saguaro National Monument and the Neighboring Region Arizona. By H. S. Swarth. Washington, Government Printing Office. 1920 pp. 1–63 [with eight plates from photographs of birds and habitats.] Dept. of the Interior National Park Service.

some reliable information regarding the birds of the region; and in choosing Mr. Swarth to prepare the account a wise selection was made, as no one has a better knowledge of Arizona bird life.

An interesting sketch of the physical features of the region with the characteristic birds and plants is presented, followed by a fuller description of the more important birds, their recognition marks, character of occurrence and habits. These sketches cover the Palmer's Thrasher, Cactus Wren, Verdin, Western Kingbird, Dwarf Cowbird, Desert Sparrow, Phoinopepla, Zone-tailed Hawk, Texas Nighthawk, Arizona Crested Flycatcher, Desert Quail, White-winged Dove, Mearns' Gilded Flicker, Gila Woodpecker, Farallon Cormorant, Pallid Great Blue Heron and Black-crowned Night Heron.

Lists are added of birds seen during a short visit to the region in 1917: thirty species on the Papago Saguaro Monument, May 30–June 4; thirty-seven at Tempe and surrounding farm lands during the same period—eighteen being identical; fifty-two at Roosevelt Lake, June 5–11 and July 2–5; fifty-seven in the Sierra Ancha, June 11–July 2 and twenty-six at Globe, July 5–7.

Mr. Swarth's pamphlet will be of great value to anyone visiting the region and forms an important contribution to the ornithology of Arizona, as well as a record of the present status of the bird life of the region for future comparison.—W. S.

Economic Value of the Starling in the United States.—This report[1] is primarily a consideration of the food of the Starling based upon an examination of 2157 stomachs of the birds collected mainly in Connecticut, New Jersey and New York and upon field investigations carried on by the authors. The results of these studies show that the food of the Starling consists largely of injurious insects and that its food habits are either beneficial or neutral so far as man is concerned, the time during which it destroys crops or molests other birds being extremely short compared with the endless hours spent in searching for insects or feeding on wild fruits.

In the opinion of the authors the Starling is a more valuable bird than the Robin or Flicker and compares favorably with the House Wren. They think that while no legislation should prevent farmers or others from killing Starlings, when actually engaged in destroying crops, the bird should on other occasions be protected by law. They admit that the great abundance and notably gregarious habits of the bird may develop some minor food habit to such a degree that it may become serious, while the roosts often become a nuisance in towns or villages. Judging by our own experience we are inclined to think that the Starling can take care of

[1] Economic Value of the Starling in the United States. By E. R. Kalmbach and I. N. Gabrielson, Assistant Biologists, U. S. Department of Agriculture, Bulletin No. 868. January 10, 1921. pp. 1–66. Four plates and several diagrams.

itself without protective legislation, and that it might be as well to leave it in that category, as it is now in most of the states where it occurs. Then in case of any undesirable development in its habits, its numbers could be checked without waiting for the repeal of a law. The bird is not now shot for any purpose and is so wary that it is difficult to approach near enough to shoot it in any numbers.

The historical account of the introduction and spread of the Starling given by the authors of this report is not so accurate as that given in Mr. Forbush's report of 1915—a publication by the way which is not mentioned, although Mr. Forbush's investigations were carried on in part under the auspices of the Biological Survey. The Starling as a matter of fact was established at Trevose Pa. by 1904; at Philadelphia by 1905 and at Cape May, N. J., by 1910; all duly published records, the last of which would have made some change in the authors' chart on page 5 had they looked it up. The great roost too at Doylestown, Pa., described in 'The Auk' for 1917, pp. 338–340 is not mentioned.

In the earlier reports of the Biological Survey authorities and references were always given for statements and data quoted from others, either published or manuscript, and other reports on the same subject mentioned, but this practice has for some reason been discontinued in later years. This is not only very annoying to those who would like to trace such authority but is contrary to the custom of scientific publications and the best of the economic works, such as 'The Game Birds of California,' Forbush's reports, etc. The excuse of lack of space which might be made in the case of Government publications is hardly a valid one as the matter could easily be arranged so as to allow for quotation of authorities. In the present report, for instance, this information would be of far greater value than the long columns of technical names of insects upon which the Starling feeds which mean nothing to anyone but an entomologist, the more important ones having already been mentioned along with their English names in the text. These remarks on methods of publication however in no way reflect upon the conscientious work to Messrs. Kalmbach and Gabrielson and the unprejudiced attitude in which they have handled the rather difficult problem of the Starling's economic status. An excellent color plate from a painting by the senior author forms a frontispiece to the report.—W. S.

Mathews' 'The Birds of Australia.'—The last two parts of Mr. Mathews' work continue the treatment of the Muscicapidae, the former bringing to a close the eighth volume—the first of the Passeriformes, including two pages of corrections to the "Check-List" which is to be bound up with Volume VIII.

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[1] The Birds of Australia. By Gregory M. Mathews, Volume VIII. Part 5. December 15, 1920. Volume IX, Part 1. February 15, 1921. H. F. and G. Witherby, 326 High Holborn, W. C. I. London.

As new names proposed in this part we notice three races of *Lewinornis rufiventris* and two of *Eopsaltria griseogularis* as well as a new genus *Peneœnanthe* (p. 273) for *E. leucura*.

In the preface the author further explains his views on the importance of anatomical characters in classification, emphasising the importance of a full knowledge of the subject but stating that "insignificant items have been given great degree and the higher classification based on variable anatomical details of little import." After all, the relative importance of anatomical and superficial characters seems to be a matter of personal opinion. Mr. Mathews objects to our use of the word "sure" in the statement "we find just as much divergence in external characters among species which we feel sure must be closely allied"; but he immediately follows with the statement that in "a group—* * * * * whose evolution as to superficies is *known* [italics ours] their morphology should be contrasted and the degree of anatomical variation determined." But if we claim to *know* how external characters have developed why may we not be *sure* of anatomical relationships? We are however heartily in accord with Mr. Mathews in his reliance upon external characters in conjunction with morphological features in improving our classification and our criticism was due really to a lack of clarity in his former statements regarding the matter.

The first part of Vol. IX covers the old genera *Rhipidura* and *Myiagra*. *Setosura setosa davidi* (p. 31) appears as a new name for *S. s. macgillivrayi*, preoccupied; while *Leucocura leucophrys carteri* (p. 41) is described as new. It is not always clear whom Mr. Mathews is naming his new forms after, as he rarely tells us. An appendix to one of his lists containing information would be valuable historically.—W. S.

Van Oort's 'Birds of Holland'.—A double part (7–8) of this important work[1] consists entirely of plates (61–80) of ducks, the text to which will be issued in Part 9. These plates are excellent in execution and are of especial interest to American ornithologists since the Blue-winged Teal, Pintail, Shoveller, European Widgeon, Goldeneye, Old-squaw, Greater Scaup and the Scoters are among the species depicted. All sexual and seasonal plumages are shown especially the eclipse plumage and the downy young which makes this a work of reference of the greatest importance. We do not recall another work in which the plumages are so fully illustrated. W. S.

Wetmore on Cave Birds of Porto Rico.—Among the mammal remains recently obtained and reported upon by H. E. Anthony from the

[1] Ornithologia Neerlandica. De Vogels van Nederland door Dr. E. D. Van Oort, directeur van 's Rijks Museum van Natuurlijke Historie te Leiden. Met ongeveer vierhonderd gekleurde platen. Martinus Nijhoff. Aflevering 7–8.

[1] Five New Species of Birds from Cave Deposits in Porto Rico. By Alexander Wetmore. Proc. Biol. Soc. Washington 33, pp. 77–82. December 30, 1920.

caves of Porto Rico are some bird bones which are being studied by Dr. Alexander Wetmore and pending the completion of his report he has published descriptions of five new species—*Polyborus latebrosus* (p. 77); *Gallinago anthonyi* (p. 78); *Oreopeleia larva* (p. 79); *Tyto cavatica* (p. 80); and *Corvus pumilis* (p. 81).—W. S.

Recent Papers by Oberholser.—In a paper on new forms of *Cyornis*[1] Dr. H. C. Oberholser describes a new subspecies of *C. rubeculoides*, two of *C. banyumas* and two of *C. elegans*, while his ninth instalment of nomenclatural changes[2] comprise *Dendrocitta celadina* (p. 83) a new name for *D. sinensis* (Lath.); *Motacilla rhadinura* (p. 83) for *M. longicauda* Rupp.; *Eremomela griseoflava perimacha* (p. 84) for *E. flaviventris* (Burchell); *Turdoides polioplocamus* (p. 84) for *Crateropus griseus* (Gm.) and *Arrenga glaucina* (Temm.) for *A. cyanea* all being preoccupied.—W. S.

Todd on New South American Birds.—Mr. W. E. C. Todd proposes in this paper[3] sixteen new forms from various parts of South America and Mexico. While some of these are adequately described there are seven in which the diagnosis consists of only two or three lines, including the trinomial name of the form with which the new one is compared. Such descriptions will in all probability prove a hindrance to any comprehensive treatment of the groups to which they belong, until Mr. Todd presents adequate descriptions or until the types are borrowed. One diagnosis reads simply "similar [to an already described form] but general coloration obviously darker and blacker" nothing further except the data of the type.

We have commented upon this sort of practice before and feel, with a large number of other ornithologists, very strongly on the subject. We fear it is useless to hope for that millenium when systematic writers will join hands in an effort to advance the science in which they work in every way possible, instead of retarding its progress by publishing these careless and slovenly diagnoses. Meanwhile why does not the Carnegie Museum take some steps to provide means of publication so that the valuable collections which it is constantly securing might be promptly and adequately described?—W. S.

Chapman on New Birds from South America.—The American Museum of Natural History has recently established a new publication under the title of "Novitates" for the immediate publication of new species, etc. The second number is devoted to the presentation of descriptions of eight new South American birds by Dr. Frank M. Chapman. As usual his descriptions are full and satisfactory and in marked contrast

[1] Descriptions of Five New Species of Cyornis. By Harry C. Oberholser. Proc. Biol. Soc. Washington. 33, pp. 85–88. December 30, 1920.

[2] Mutanda Ornithologica. IX. *Ibid.* pp. 83–84.

[3] Descriptions of Apparently New South American Birds. By W. E. Clyde Todd. Proc. Biol. Soc. Washington. 33. pp. 71–76. December 30, 1920.

to certain others that we have been compelled to comment upon. Full comparisons are made with the closely allied forms and not infrequently all of the races of a species are reviewed and discussed in connection with the proposed new race.[1]

The new forms described are as follows: *Capito brunneipectus* (p. 1) Rio Tapajoz, Brazil; *Nonnula amaurocephala* (p. 2) Rio Solimoes, Brazil; *Rhopochares cochabambae* (p. 2) Cochabamba, Bolivia; *Microrhopias emiliae* (p. 3) Rio Xingu, Brazil; *Drymophila devillei subochraceus* (p. 4) Rio Curua, Brazil; *Hypocnemis hypoxantha ochraceiventris* (p. 5) Rio Xingu, Brazil; *Siptornis punensis cuchacanchae* (p. 5) Cuchacancha, Bolivia; *Cistothorus platensis caracasensis* (p. 6) Caracas, Venezuela.

Five of these new forms are described from a collection submitted for study by Dr. E. Snethlage of the Museu Goeldi at Para, while the others are from the American Museum collection.—W. S.

Bangs and Penard on Some American Birds.—This paper[2] consists of a collection of miscellaneous notes dealing mainly with neotropical birds. *Crotophaga sulcirostris pallidula* (p. 365) is proposed for birds of the isolated colony at Cape St. Lucas; *Muscifur* (p. 376) is proposed for *Myiarchus semirufus* Scl. & Salv.; *Allenia apicalis* is changed to *A. fusca* on grounds of priority; the races of *Dendroplex picus, Myiozetetes cayanensis, Tyrannus melancholicus, Pachyrhamphus polychopterus* and *P. marginatus* are reviewed with the result that the following are described as new: *D. p. bahiae* (p. 369) E. Brazil; *M. c. harterti* (p. 374) Panama; *P. m. nanus* (p. 395) E. Peru. A further study of the Lafresnaye types discloses the fact that the type of *Lophotriccus spiciferum* is really a specimen of *Colopteryx galeatus* which necessitates the changing of the name of the latter species to *Lophotriccus galeatus* while the former, for which there is neither a generic nor specific name available, is renamed *Cometornis vitiosus* (p. 373).—W. S.

Hellmayr on the Birds of Southeastern Peru.—This paper[3] is based upon collections made by H. and C. Watkins in the Sierra de Carabaya, province of Puno, Peru, numbering some 250 species and 1200 specimens. It is in the form of an annotated list with very full discussion of the characters of the forms and such questions of relationship and nomenclature as have arisen in connection with them. A few new forms have already been described from the collections in the 'Proceedings' of the Bavarian Ornithological Society 1912–1914 and the following appear in the present paper: *Ramphocelus carbo centralis* (p. 26) Agua Suja, Brazil; *Spizitornis parulus patagonicus* (p. 51) Neuquen, Argentina; *Lepidocolaptes lacrymiger carabayae* (p. 81) Sierra de Carabaya, Peru.

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[1] Descriptions of Apparently New Birds from Bolivia, Brazil, and Venezuela. By Frank M. Chapman. American Museum Novitates. No. 2. pp. 1–8. January 31, 1921.

[2] Notes on Some American Birds, Chiefly Neotrpical. By Outram Bangs and Thomas E. Penard, Bull. Mus. Comp. Zool., LXIV, No. 4, pp. 365–397. January, 1921.

[3] Ein Beitrag zur Ornithologie von Südost–Peru. Von. C. E. Hellmayr. Archiv. fur Naturg. 85. Heft. 10. November, 1920. pp. 1–131. [In German.]

Among other interesting nomenclatural points to which attention is called in this valuable paper is the fact that by Gray's designation the type of the genus *Picolaptes* is a species of *Xiphorhynchus* and the name falls into the synonymy of the latter genus while *Thripobrotus* a substitute name takes the same course leaving *Lepidocolaptes* Reich. as the proper name for this group. In this paper Dr. Hellmayr has made another valuable contribution to systematic Neotropical ornithology.—W. S.

Kuroda on New Japanese Birds.—In the last volume of the 'Dobutsugaku Zasshi' (XXXII, pp. 243–248 (1920)), Mr. Nagamichi Kuroda describes three new forms of Japanese birds as follows: *Milvus lineatus formosanus* (p. 243) Central Formosa; *Nyroca ferina ferinoides* (p. 243) Naneda, near Tokyo; *Campephaga lugubris asakurai* (p. 244) Central Formosa. The descriptions are given in both Japanese and English.—W. S.

Gurney on Norfolk Ornithology.—Mr. John Henry Gurney has recently published a bibliography[1] of his ornithological writings covering the period from 1866 to 1918 and dealing mainly with the birds of Norfolk, and also a list of references to the annual 'Ornithological Reports for the County of Norfolk' which he has prepared for the years 1879 to 1918. There are few local records of this kind covering so long a period of years. In this country the record of the Delaware Valley Ornithological Club appearing each year in 'Cassinia' has now covered twenty years and is perhaps the longest record of the sort in America. As president of the Norfolk and Norwich Naturalists' Society Mr. Gurney has recently delivered as his annual address[2] on the ornithologists of Norfolk and their work which has been published in the 'Transactions' of the society.—W. S.

Bulletin of the Essex County Ornithological Club.—Another of the excellent publications[3] of this active organization is before us which fully maintains the high standard of its predecessor. Besides the many local notes and the account of the annual Ipswich River trip there are several articles of general interest. Mr. R. A. Nichols has an account of variation on the song of the Whip-poor-will. He presents much original observation and comment on the observations of others, and speaks of the difficulty of making a syllabic representation of bird song that will be satisfactory to another person. This has often occurred to us and we are inclined to think that the trouble is that, in many of the common syllabic representations, the attempt has been made to use actual words of the

[1] Articles on Ornithology and Ornithological Reports for the County of Norfolk. By J. H. G., 1918, pp. 1–8.

[2] Presidential Address. By J. H. Gurney, F. Z. S. Reprinted from the Proc. Norfolk and Norwich Naturalists' Society, 1919–1920, Vol. XI, Part 1. pp. 1–22.

[3] Bulletin of the Essex County Ornithological Club. December, 1920, pp. 1–54. Price, 50 cents.

English language instead of trying to represent the sound by letters without any reference to the words they may or may not form. Thus "whip-poor-will" is less satisfactory than "whip-poo-weel" as Mr. Nichols says, while his "whip-oor-eel" as the song of a particular bird that he studied exactly denotes the call of one to which we have listened. Mr. C. J. Maynard has a paper on his original discovery of the Ipswich Sparrow which has much historic value and in this connection we might call attention to Alexander Wilson's figure of the bird as the "male" of the Savannah Sparrow long before Mr. Maynard took his specimen (cf. Osprey II. p. 117.).

A paper on the nesting, song and play of the Tree and Barn Swallows by Dr. C. W. Townsend contains a mass of interesting observations on the habits of birds that have been far too much neglected. Mr. A. P. Stubbs has an instructive discussion of the white gulls of Swampscott. Five perfectly distinguishable gulls of pure white or nearly white plumage were recognizable among the Herring and Black-backed Gulls, and after fourteen seasons' study of them it was finally decided that they represented different plumages of only two species—the Glaucous and Iceland Gulls. Just such studies as this are needed to aid in the identification of gulls in the field, as the several plumages of a single species are quite as different to the observer as those of several different species, and they must all be learned before accurate identifications can be made.

Mr. A. B. Fowler takes exception to part of the comment on the sight record of the Connecticut Warbler on the Ipswich River trip of 1919, which appeared in the review in 'The Auk', considering that Mr. Brewster's remarks on the rarity of the species made thirteen years ago have little weight today. The point was that *alleged* occurrences of the bird were as numerous at that time as today, while actually proven cases of its occurrences in spring in the east are just as rare now as then. The main intent of the criticism, however, was that there was no clear evidence that the observers realized that they were making a most unusual record for all of eastern North America as well as for the Ipswich River. It is of course entirely a matter of opinion as to the desirability of publishing such records which are of the greatest importance if correct but which can never be proven and hence are useless for any generalizations.—W. S.

Bulletin of the Illinois Audubon Society.—This attractively gotten up publication[1] contains much of interest concerning the conservation of nature in general and the activities of the society. Much space is devoted to the problem of the preservation of our National Parks and we are reminded again of the action of the last Congress in granting to a Federal Water Power Commission the authority to lease all public waters including those in National Parks and Monuments and of appli-

[1] The Audubon Bulletin. Fall, 1920. Published by The Illinois Audubon Society, pp. 1–48.

cations that have already been made for establishing dams and power houses in the Grand Canyon and the Sequoia National Parks. Unless this privilege, so far as it affects parks, is revoked by Congress, there is no knowing what it may lead to. The preservation of many birds is dependent upon the preservation of the forests and the latter upon keeping the National Parks inviolate.—W. S.

Annual Report of the Chief of the Biological Survey.—Only those who read this report[1] carefully will have any idea of the extent and diversity of the work that the Survey is now carrying on. Under economic work in mammals we find that no less than 21,558 Coyotes were killed during the past year and in addition some 4000 other predatory animals. The practical extermination of the Prairie Dog over a great part of Cochise and Graham Counties, Arizona, has also been effected and nineteen million acres in the west have been subjected to poison treatment for the extermination of rodents. The tremendous result of poisoning may be realized when we learn that 1000 rabbits were killed for each ounce of strychnine used in Gooding County, Idaho. It seems certain that by means of poison the extermination of many species of mammals, if desired, is only a matter of time, and we trust that all possible indirect results of this tremendous overthrow of nature's balance may be carefully taken into consideration before the final result is attained.

Under economic ornithology we learn that investigations of the Survey have proven the Meadowlarks seriously injurious to sprouting oats and corn in South Carolina and the Secretary of Agriculture has authorized their killing from November, 1919 to April, 1920. Similar permission to kill Robins in the cherry growing districts of New York has been granted from June 1 to July 15, as well as the killing of Grebes, Loons, Terns, Gulls, Mergansers, Bitterns, Green, Great Blue, Little Blue and Black-crowned Night Herons, at fish hatcheries, and of Mergansers by state wardens along any of the streams of Michigan where they prove destructive to trout.

Charges against the Dove in South Carolina, Geese in eastern Maryland and Thick-billed Parrots in Arizona have not been substantiated, while the claim that birds were being poisoned in the western states by the operations against vermin were found to be greatly exaggerated, the birds killed being "not enough to cause alarm."

The work of the Bird Banding Association, as already reported, has been taken over by the Survey and the study of the economic value of various birds and investigations on their distribution and migration have been continued.

Under the head of bird reservations the disastrous effect of shutting off the water supply of the Klamath and Malheur Lake reservations is referred to and unless this action can be checked the reservations seem

[1] Report of Chief of Bureau of Biological Survey. Annual Report Department of Agriculture pp. 1–36 (covering fiscal year ending June 30, 1920.)

doomed. It is deplorable that some cooperation of the different departments of the Federal Government cannot be arranged to prevent such a disaster as is here imminent. In the case of the migratory bird law there is splendid cooperation all along the line from both Government and independent organizations and the results are too well known to require further comment. But where water power or water privileges are involved both bird reservations and National Parks seem to be in the greatest danger.—W. S.

Crandall on the Eclipse Plumage in the Domestic Fowl.—Mr. Crandall describes the eclipse plumage of the Red Jungle Fowl as exhibited in birds in the New York Zoological Gardens obtained from the Philippines and also a similar plumage in a domestic Black-bellied Red Game Cock and suggests that the lack of records of this phase of plumage in the domestic fowl is probably due rather to carelessness of observation than to its absence.—W. S.

Economic Ornithology in Recent Entomological Publications.—The U. S. Bureau of Entomology in several recent bulletins has included information on bird enemies. These enemies and the insects affected are noted in the following paragraphs:

Spotted Apple-tree Borer (*Saperda cretata*).—This beetle does not seem to be near so serious a pest as its congener the round-headed apple-tree borer. Its operations result in unthriftiness of the tree attacked and sometimes the death of limbs. Fred E. Brooks, author of the bulletin[2] relating to it says: "By far the most effective natural check to the increase of this borer seems to be the woodpeckers. The borers feed in positions easily accessible to these birds and empty burrows are to be found on almost every infested tree, with the marks of the birds around the wounds giving unmistakable evidence of the cause of the borer's disappearance. During the present studies every attempt to rear larvae in unprotected trees met with a loss of all the individuals as a result of woodpecker attack. The species of bird responsible for the loss of the borers was not determined definitely, but all the evidence pointed to the downy woodpecker, *Dryobates pubescens medianus*. It seems probable that the spotted apple-tree borer would be a much more widely known and destructive pest were it not for the constant depletion of their numbers by woodpeckers."

Clover Stem-borer (*Languria mozardi*).—In southwestern irrigated regions this beetle has recently become a pest of considerable importance to alfalfa culture. The head and thorax of this beetle are deep red in color, and the remainder of the body bluish black. Thus it is a typical example of a warningly colored insect and moreover belongs to a family supposed to be distasteful. However, V. L. Wildermuth and F. H. Gates

[1] Eclipse Plumage in Domestic Fowl. By Lee S. Crandall. Zoologica, II, 15. No. 11. October 1920.

[2] Bul. 886, U. S. Dept. Agr., Oct., 1920, pp. 8–9.

who have prepared a treatise upon it say[1]: "The clover stem-borer, like many of our older native species, is in a great majority of cases kept in check by its natural enemies." Hymenopterous parasites, toads and birds are recorded as feeding upon the clover stem-borer, the birds being Traill's flycatcher, starling, meadowlark, mockingbird Carolina wren and robin.

Beet Leaf-beetle (*Monoxia puncticollis*).—This is a native species that has transferred its attentions from its natural food plants to sugar beets and in some instances has caused serious damage. This is another of the so-called protected insects of the supposedly nasty phytophagous group and is buff and black or warningly colored. Nevertheless it "has a goodly number of natural enemies" among which are ladybird beetles a stink-bug, parasites, toads and birds. "The Bureau of Biological Survey[2] has found specimens of the beet leaf-beetle in the stomachs of the starling (*Sturnus vulgaris*) and prairie chicken (*Tympanuchus americanus*) and of other species of the genus Monoxia in the stomachs of the northern and Wilson's phalaropes (*Lobipes lobatus* and *Steganopus tricolor*), least flycatcher (*Empidonax minimus*), English and vesper sparrows (*Passer domesticus* and *Pooecetes gramineus*), violet-green swallow (*Tachycineta thalassina*), and pipit (*Anthus rubescens*)."

Western Cabbage Flea-beetle (*Phyllotreta pusilla*).—This agile little beetle when abundant destroys young cabbage plants, but it does not restrict its attentions to cabbage, attacking also beans, peas, beets, mustard, kale and rape. It seems to have few natural enemies, but the authors state[3] that the Biological Survey has found the species "in the stomachs of three species of birds and other beetles of the same genus in the stomachs of 12 kinds of birds." Birds thus would appear to be the most important natural enemies of this pest.

Grape-vine Flea-beetle (*Altica chalybea*).—This is one of the best known and most widely distributed enemies of the grape and has caused severe injuries in restricted localities. A few natural enemies are recorded[4] among which are 8 species of birds: the bobwhite, meadowlark, Cape May warbler, the red-eyed, white-eyed and Philadelphia vireos, the Carolina wren and bluebird.

Clover-leaf Weevil (*Hypera punctata*).—This beetle, one of the important clover pests was accidentally introduced from Europe. It is of interest that some of the data relating to its spread in this country was obtained by examination of birds stomachs: the first specimen reported from Michigan was found in the stomach of a crow. The authors of a recent bulletin upon the pest state that birds are a valuable and import-

[1] Bul. 889, U. S. Dept. Agr., Oct., 1920, p. 19.

[2] Chittenden, F. H. and Marsh, H. O., Bul. 892, U. S. Dept. Agr., Oct., 1920, p. 18.

[3] Chittenden, F. H. and Marsh, H. O., Bul. 902, U. S. Dept. Agr., Oct., 1920, p. 14.

[4] Isely, Dwight. Bul. 901, U. S. Dept. Agr. Dec. 1920, pp. 22–23.

ant check on the insect and that it is known to be eaten by 25 species. This list has been increased to 42 of which the crow, crow blackbird and starling are the most effective.—W. L. M.

Economic status of the Kingfisher and Rook in Great Britain.—Dr. Walter E. Collinge's latest publications in economic ornithology deal with these two species. The paper on the Kingfisher is the detailed report of which an advance summary has previously[1] been reviewed.

"A summary of the percentages of the various food items shows that 77.4 per cent of the food is of a neutral nature, 15.66 per cent is beneficial, and only 7.28 per cent is injurious." The bird is considered useful rather than otherwise in relation to trout streams.

Respecting the Rook, Dr. Collinge finds[2] that the species has increased in recent years, with probably some change in feeding habits so that it is doing more harm than good. Its economic tendencies are rated as: injurious 52 per cent, beneficial, 28.5 per cent, and neutral, 19.5 per cent. Repressive measures are recommended in the hope that reduced to normal numbers the species will again prove a help rather than a hindrance to agriculture.—W. L. M.

The Ornithological Journals.

Bird-Lore. XXII, No. 6. November–December, 1920.

A Partridge Don Quixote. By H. H. Cleaves.—An account of a tame Ruffed Grouse with illustrations from life.

Why do Birds Bathe. By E. T. Seton.—Discusses sun baths, dust baths, showers and plunges, and their practice by different groups of birds. As this is a topic about which comparatively little has been written attention might be called to Mr. Howard Scudder's paper in 'The Auk' for 1915, p. 455, which treats the subject from a slightly different angle.

The Migration and plumages of N. A. birds covers the Cowbirds with a plate by Fuertes.

Dr. A. A. Allen discusses nests with a key to those of eastern birds.

The Boat-Blind in the Snow. By G. A. Bailey. Excellent photographs of winter birds.

Bird-Lore. XXIII, No. 1. January–February, 1921.

The twenty-first Christmas census takes up the entire number except for 'The Season' and the editorial and Audubon Society departments. There are 134 lists of which those for Montauk Point, N. Y., and Cape May, N. J., with thirty-eight species each, are the largest for the Northern

[1] 'The Auk' Vol. 37, No. 3, July, 1920, p. 484.

[2] On the Economic status of the Kingfisher, Alcedo ispida Linn. The Ibis, Jan., 1921, pp. 139–150.

[3] The Rook: its relation to the Farmer, Fruit Grower and Forester. Journ. Ministry Agr., Vol. 27, No. 9, Dec. 1920, reprint 8 pp.

and Middle states. We notice that the Broad-winged Hawk appears again in a Pennsylvania list, a very unlikely occurrence.

Dr. A. A. Allen has an excellent article in the school department on the flight of birds.

The Condor. XXII, No. 6. November–December, 1920.

The Wing Claw in Swifts. By Alexander Wetmore.—Decides that it is not of taxonomic value but is generally present and is probably an archaic character of no present use.

Nesting of the Olive-sided Flycatcher in Berkeley, Calif. By Jos. Dixon.

The Condor. XXIII, No. 1. January–February, 1921.

Acorn Storing by the California Woodpecker. By William E. Ritter.—A valuable study of this much neglected subject. The evidence indicates that the grubs that develop in the acorns are the chief object in storing them, although the meat of sound acorns is also eaten by the birds, after the supply of grub-infested ones is exhausted. It also seems clear that the holes are made solely for the purpose of storing acorns and are often made sometime in advance of the ripening of the crop. There is no evidence that they were originally made in the course of digging for boring larvae but rather that the habit developed from an original process of sticking the acorns in natural holes or crevices in the bark, which is still sometimes done. An additional argument in favor of this theory which the author does not mention is that the Red-headed Woodpecker, of the east, has this habit occasionally developed although it has never advanced to the stage of digging special holes or attempting to store acorns on a large scale. Prof. Ritter finds also that the instinct of the birds occasionally goes wrong and they store pebbles by mistake, while they make many holes that are never used and he considers that the habit is at bottom a rather generalized one which accounts for the maladaptations which are exhibited.

Suggestions Regarding the Systema Avium. By R. C. McGregor.—We are glad to see Mr. McGregor's views on what he considers an ideal 'Systema Avium' though the opinion of each one of us will differ materially. It is however Utopian to expect to reach the ideal at one stroke. The proposal of the B. O. U. which was accepted by the A. O. U. was for a series of regional lists, which should agree in nomenclature in all cases where they overlap, and if this can be accomplished a great step will have been made toward Mr. McGregor's ideal. Even the preparation of a Nearctic and a Palaearctic volume with uniform nomenclature will be a great accomplishment. The two most serious features in the whole problem Mr. McGregor fails even to mention i. e., (1) How shall we finance the publication of such a work as he suggests? and (2) Where shall we find a "small committee" of men with the time and ability to do the work properly? We however welcome heartily his remarks on two other matters, (1) his willingness to follow an official list and sink his personal opinions.

Only by such action can uniformity in nomenclature be attained and the frequent ignoring of our standard lists today only retards our work and limits the usefulness of the papers by authors who follow such practices. (2) The inclusion in the list of all subspecies not absolutely proven worthless, to be weeded out later as our knowledge increases. It is a waste of time for any committee to try to settle, off-hand, all such cases as these.

A Hunter's Notes on Doves in the Rio Grande Valley. By Aldo Leopold.

Concerning the Status of the Supposed Two Races of the Long-billed Curlew. By Joseph Grinnell.—Seems to pretty thoroughly dispose of the alleged differences.

Notes on Some Specimens in the Ornithological Collection of the California Academy of Sciences. By Joseph Mailliard.

The Oologist. XXXVII, No. 12. December 1, 1920.

Watching a Hummingbird Feed her Young. By R. A. Sell.

El Hornero. II, No. 2. December, 1920. [In Spanish.]

The Ostriches of the Argentine Republic. By R. Dabbene.—A synopsis of the species of *Rhea* and *Pterocnemia* found in the Argentine.

The Birds of the Chaco. By Enrique L. Arribalzaga.

Notes on the Shorebirds of North America which Winter in the Argentine Republic. By R. Dabbene.

The Ibis. (XI Series.) III, No. 1. January, 1921.

On a Recently Described Woodpecker (*Picus rubricollis*) from Siam. By E. C. Stuart Baker.—With a colored plate.

Notes on the Birds of Northeast Chihli, in North China. By J. D. D. La Touche. Part III.—Nos. 182–307, apparently completing the list.

On Some Western Australian Birds collected between the Northwest Cape and Albany (950 miles apart.) By Thomas Carter. With nomenclature and remarks by G. M. Mathews. (Continued.)

Remarks on Rare and otherwise Interesting Birds contained in Collections made by Mr. G. L. Bates in Southern Cameroon. By D. A. Bannerman.

On the genus *Macrosphenus* Cassin, with special reference to the races of *Macrosphenus flavicans*. By D. A. Bannerman.

A Note on the Breeding Birds of Crete. By Col. R. Meinertzhagen.

On the Economic Status of the Kingfisher, *Alcedo ispida*. By W. E. Collinge.—Found to feed on quantities of insect larvae injurious to fish spawn and very young fish. The injurious elements in its food far outnumber the beneficial, and protection for the bird is strongly advocated. Further examination of the food of our own Kingfisher might be well worth while, though it is doubtless far more injurious to fish than its little trans-Atlantic relative.

Bulletin of the British Ornithologists' Club. No. CCLIII. November 9, 1920.

Forty new forms of birds are described from East and West Africa, India and other parts of Asia, and Crete.

Bulletin of the British Ornithologists' Club. No. CCLIV. November 30, 1920.

Six new forms from Africa and the Malay region are described.

In the discussion on the increased cost of printing the 'Bulletin' the suggestion was made that the length of the descriptions of new forms could be shortened considerably, which seems to us a very unfortunate possibility as it would be better not to publish new forms at all, until it is possible to publish them properly.

Mr. Mathews has two new genera *Proseisura* (p. 35) for *Arses lorealis* and *Nesoceryx* (p. 35) for *Charadrius bicinctus*. The editor calls attention to the fact that *Siphia obscura* Sharpe supposed to be from Borneo is really *Basileuterus rivularis*.

Mr. J. L. Bonhote made an address on Bird Protection, treating the matter impartially and with great fairness. He points out that sentiment is the most powerful element in securing the protection of any animal, and if well developed is all sufficient. Apathy and ignorance on the part of the general public are the cause of lack of sentiment and are the most serious obstacles to making protective laws effective. Sentiment on the other hand is a dangerous hindrance to the operation of a law for the decrease of a species proven to be noxious. Mr. Bonhote seems to us to underestimate the value of birds as insect destroyers, though we grant that excessive protection may make a bird so numerous that its injurious qualities outrank its beneficial ones, although the opposite may have been the case before it became so plentiful—as for example the Thrushes in England and the Robin in certain parts of America. In connection with collecting of birds or eggs he points out that the critical period of a bird's life with regard to the perpetuation of the species is the breeding season and the collecting of eggs, which affects directly the breeding season, is more serious than the collecting of skins. Collecting of eggs as he also points out comes especially into prominence, from the fact that the rarer a bird is the greater are its eggs prized.

A few years ago the Kite in England was reduced to nine birds and it was necessary to provide absolute protection by law as well as barbed wire protection, two keepers and several watch dogs to save from the egg collectors, the three nests that were built. The same absolute disregard by collectors in this country for the preservation of a species on the very verge of extinction is seen in the case of the California Condor, the Raven, etc., where the possession of the eggs by collectors seems to be paramount to every other consideration.

Bulletin of the British Ornithologists' Club. CCLV. December 24, 1920.

Six new forms from Africa and India are described.

Bulletin of the British Ornithologists' Club. CCLVI. January 27, 1921.

Seven new birds from Africa and Asia are described as well as a new snipe, *Coenocorypha aucklandicae iredalei* (p. 63), from New Zealand,by Lord Rothschild.

British Birds. XIV, No. 7. December 1, 1920.

Some Notes on the Ruff. By Miss E. L. Turner.—An exceedingly interesting paper illustrated by photographs of Ruffs fighting.

Notes on the Nestling-Downs of the British Hawks. By H. F. Witherby. A valuable contribution to the study of molts and plumages. The author finds three distinct sets of down in these birds; (1) a fairly short and not very thick down, which is present when the bird is hatched; (2) short tufts of white down growing here and there amongst the former; and (3) a thick woolly, usually gray, down, which covers 1 and replaces 2 and grows in many places where no down grew before. It is in turn superceded by the plumulae or under down feathers of the regular plumage, but it is not, as considered by Mr. C. Ingram, identical with them.

The Food of the Peregrine Falcon. By J. F. Peters.—A remarkable list of birds upon which it preys.

British Birds. XIV, No. 8. January 1, 1921.

Notes on the Breeding of the Leaser Kestrel. By F. N. Chasen.

Further Notes on the Nesting of the Storm-Petrel. By Audrey Gordon

A Contribution to Swan History. By N. F. Ticehurst.—The keeping and marking of Swans dates back to a very early period of English history and has resulted in curious "swan laws" and "rights." Mr. Ticehurst has traced these back and presents a diagram of a "swan mark" used by Sir Richard de Totesham about 1370—perhaps the earliest "bird-band" on record!

British Birds. XIV, No. 9. February, 1921.

The Avocet at Home. By E. L. Turner. With interesting photographic illustrations.

The Avicultural Magazine. XI, No. 12. December, 1920.

A Control Board for the Export of Australian Animals.—Presents details of the laws now in effect.

The Avicultural Magazine. XII, No. 1. January, 1921.

Diet for Rearing Young Birds. By M. Amsler.

The Emu. XX, Part. 3. January, 1921.

This number is almost entirely devoted to the ornithology of Western Australia in connection with the holding of the annual congress of the R. A. O. U. in this territory for the first time. The completion of the transcontinental railway has made such a trip as this possible, and Americans who have not considered the matter carefully, may be interested to know that the distance from coast to coast is approximately the same in Australia as it is in the United States, while some of those who participated in the trip travelled at least half as far again. When we learn that 31 of the eastern Australian ornithologists made the trip we are forced to admit that their enthusiasm is far greater than that of the mem-

bers of the A. O. U. as judged by the attendance of easterners at San Francisco or of westerners at the eastern meetings, but it might be interesting to know what the railroad fares might be in the southern continent!

The train was stopped in the great interior desert where opportunity was given to see some of the strange birds and wild flowers, while during the whole journey the nomenclature committee kept steadily at work. The report of this committee is very encouraging and the new list will go far toward the uniformity of nomenclature for which we are all striving.

Besides the reports of the meeting and the results of the field trips made in connection with it, there is a valuable account of the birds of the Swan River district by W. B. Alexander and of those of Dirk Hartog Island by F. Lawson Whitlock.

The Austral Avian Record. IV, No. 4–5. December 16, 1920.

A Name List of the Birds of Australia. By G. M. Mathews and Tom Iredale. (Completed)—With annotations.

Forgotten Bird Artists and an Old-time Ornithologist. By G. M. Mathews and Tom Iredale.—An interesting review of the Watling drawings and suggestion that certain other drawings sometimes attributed to him were by Gen. Davies who was evidently an ornithologist of considerable attainments.

Snipe and Sandpipers. By G. M. Mathews and T. Iredale.—Some further suggestions on their classification.

The South Australian Ornithologist. V, Part 4. October 1, 1920.

The Birds of Kuitpo Forest. By S. A White.

Revue Francaise d'Ornithologie. XII, No. 139. November 7, 1920. [In French.]

On the nesting of *Aquila fasciata*. By M. Mourgue and J. L.'Hermitte.

Revue Francaise d'Ornithologie. XIII, No. 141. January 1921.

By-Laws for the proposed French Ornithological Society.

Study of a Collection of Birds from Equatorial Africa. By J. Berlioz.

L'Oiseau. I, No. 8. August, 1920. [In French.]

Breeding of the Nightingale in captivity. By N. Mayer.

L'Oiseau. I, No. 9. September, 1920.

The Gang-gang Cockatoo. By J. Delacour. With colored plates (continued).

Experiences of a Naturalist in French West Africa. By Mr. Millet-Horsin. (Continued.)

Experiments in Masculinity. By A. Pezard.—Male Pheasants with female characters etc. (Continued.)

Hybrid between the Mikado and Elliot's Pheasants. By P. Crepin.

Ardea. IX, No. 2. September, 1920. [In Dutch.]

Biographical sketches of J. Buttikofer; and J. Ritzema Boz; who died during the year, and also an account of the life of Temmink by W. H. de Beaufort with two portraits.

Ornithologische Beobachter. XVIII, No. 3. December, 1920. [In French and German.]

Ornithological Notes from the Region of the Bosphorus. By A. Mathey-Dupraz. (Continued.)

The issues for October, November and January are devoted mainly to local notes.

Danske-Fugle. 1920. No. 1. [In Danish.]

Contains an article on the food of the Stork (*Ciconia alba*) by P. Skovgaard, with detailed list of insects, etc., and a list of the birds banded by the Danish Ornithological Society.

Danske-Fugle. 1920. No. 2.

Contains a detailed account of the food habits of the Short-eared Owl (*Otus vulgaris*).

Proceedings of the Ornithological Society of Bavaria. XIV, No. 4. December, 1920. [In German.]

Miscellanea Ornithologica. By C. E. Hellmayr. Contains a number of nomenclatural changes and a record of *Vermivora leucobronchialis* in W. Venezuela.

A New Woodpecker from Sumatra. By E. Stressemann. *Dryobates canicapillus volzi* (p. 288) and a new name *Picus myrmecophoneus* (p. 289) proposed by the same for *Picus striolatus* Blyth.

Ornithologische Monatsberichte. 28. No. 11–12. November–December, 1920. [In German.]

Our Knowledge of the Geographic Forms of *Alseonax murinus*. By H. Grote.—*A. m. subtilis* (p. 114) is described as new from Beni, central Africa.

Falco. For 1917. [In German.]

Contains a number of new names for varieties of European birds proposed in the author's peculiar way. What status his work will have in systematic ornithology may be open to question.

Tori. II, No. 10. December, 1920. [In Japanese.]

A List of the Birds of Dagelet Islands, Corea, with Detailed References to Some Species, By N. Kuroda and T. Mori.—Five new forms are described as follows: *Dryobates leucotos takahashii, Parus major dageletensis, P. varius saisiuensis, P. v. utsorioensis,* and *Chloris sinica clarki.* There is an English translation of the descriptions of the new forms and a colored plate of the races of *Parus varius.*

Ornithological Notes from the Neighborhood of Sasanami, Prov. Nagato. By Y. Kanetsune.

On the Breeding Seasons of Some Birds in Prov. of Miyagi. By S. Kumagai.

Notes on the Breeding Habits of *Ninox scutulata* (Raffl). By M. Kawaguchi and H. Ikemura.

Ornithological Articles in Other Journals.

Middleton, J. C. Birds and How to attract them about our Homes. (Canadian Field Naturalist, May, 1920.)

Townsend, Chas. W. Notes on the Summer Birds of the Gaspé Peninsula (continued) (*Ibid.*)

Mousley, H. The Diving Habit and Community Spirit of the Spotted Sandpiper. (*Ibid.*)—In addition to the publications cited by Mr. Mousley we might add L. L. Jewel, 'Auk,' 1915, p. 227.

Lewis, Harrison F. Among the Coffin Carriers. (*Ibid.* September, 1920).—Being an account of the Great Black-backed Gull.

Williams, M. Y. Notes on the Fauna of the Moose River and the Mattagami and Abitibi County Territories. (*Ibid.* October, 1920.) A list of the birds observed.

Lewis, Harrison F. Change in the Status of Certain Birds in the Vicinity of Quebec. (*Ibid.*)

Blackwood, G. C. Notes on the Breeding Habits of the Dotterel in Scotland. (Scottish Naturalist, Nov.–Dec., 1920.)

Brock, S. E. Bird Associations in Scotland (continued). (*Ibid.* Jan.–Feb., 1920).—An ecological study.

Ridgway, R. Diagnoses of Some New Genera of Birds. (Smithsonian Misc. Coll. 7, No. 4. December 6, 1920.)—*Oroaetus* (p. 1) for *Falco isidori* Des Murs; *Phaeoaetus* (p. 2) for *F. limnaetus* Horsf.; *Morphnarcus* (p. 2) for *Leucopternis princeps* Sclater; *Percnohierax* (p. 2) for *Falco leucorrhous* Quoy and Gaim.; *Hapalocrex* (p. 3) for *Rallus flaviventris* Bodd. and *Limnocrex* (p. 3) for *Porzana cinereiceps* Lawrence.

Gabrielson, Ira N. The Birds of Marshall Co., Iowa. (Proc. Iowa Acad. Sci. XXVI, pp. 47–75.) A continuation of a paper in the preceding volume, carrying the list to 201 species with five hypothetical.

Burkitt, J. P. The Relation of Song to the Nesting of Birds. (Irish Naturalist, January, 1921.)

Foster, N. H. Birds' Songs at Hillsborough, Co. Down. (*Ibid.* February, 1921.)—Supplements the preceding.

Swales, B. H. Rare Birds in the Vicinity of Washington, D. C. (Proc. Biol. Soc. Wash. XXXIII p. 181.)

Wetmore, Alexander. The Soft Parts of the Anhinga. (*Ibid.*)

Osgood, W. H. The Turkey as a Subject for Experiment. (Amer. Naturalist, January–February, 1921.)—Calls attention to the known origin of the domestic bird and the definite subspecies of the wild one, as well as the fact that the former has retained its subspecific characters through long domestication. Altogether the bird forms an excellent subject for genetic experiment, far better than most of those used, the origin of which is hopelessly obscured.

McAtee, W. L. The "One-Letter" Rule for Generic Names in Zoology. (The Amer. Naturalist January–February, 1921.)—The writer,

after calling attention to the failure of the various codes of nomenclature to cover the question of what constitutes a "different" name, finds fault with certain authors for following the A. O. U. Code, which is the only one that attempts to present a definite ruling. The criticism is entirely destructive so far as we can see, and no solution is offered. The results of the A. O. U. rulings may not be consistent, it is true, but questions of this sort have to be settled arbitrarily and inconsistency is bound to result. The wisest way would probably be to "let sleeping dogs lie" in such cases, and not propose new substitute names until we have some arbitrary board which will say "these names are the same, these are different." No *rule* can be framed that will do the work automatically. If the other extreme to the one Mr. McAtee criticises were to be followed as thoroughly, there would be just as many undesirable changes.

Illidge, R. The Channel-bill or Rain-bird. (Queensland Naturalist, II, p. 106.)

Owen, J. H. The Sparrowhawk. (Nature, CVI, p. 695.)—A life history with excellent illustrations from photographs of this British bird.

Hankin, E. H. The Problem of Soaring Flight. (Proc. Cambridge Philos. Soc. XX, p. 219.)

Hesse, Erich. On the Name *Columba pallida* Latham. (Mittl. Zool. Mus. Berlin, 8, p. 311.) [In German.]

Olsen, A. Madagassisk Bird Names. (Nyt. Magazin for Naturvid. 58, p. 65.) [In Finnish.]

DeQuiros, Jose L. Ornithological Excursion to Janda [Spain]. (Biol. R. Soc. Espan. Hist. Nat., XX, No. 7, p. 236.) [In Spanish.]

Berkmann, M. A comparison of the Birds of eastern and western Hanover. (Jarsb. Naturh. Gesell. Hannover, IV, pp. 48–82.) [In German.]

Anon. The Crossing of the North and South African Ostriches. The Success of the Experiment. (Jour. Dept. of Agric. Union of S. Africa. Nov. 1920, p. 737.)

Doderlein, L. [A "Leitmotiv" in Animals.] (Die Astersden der Siboga Expedition. II Gattung Lindia, p. 194.)—Suggests a "Leitmotiv" in every well defined and properly understood group of animals, which may or may not be of systematic importance. The wonderful development of plumes in male Paradise birds is cited as an example of such a "Leitmotiv," these plumes developing on the head, breast, back or tail as the case may be, but always present somewhere. [In German.]

Woods, Frederick A. A Random Test in the Theory of Protective Coloration. (Jour. of Heredity, XI, No. 6.)

Lanbmann, A. Critical Investigation into the Fixing of Genotypes in Lesson's "Manuel d'Ornithologie" 1828. (Archiv. für Naturgischichte, LXXXV, abt. A., Heft 4.) [In German.]

Additional Publications Received.—Hollister, N. Report of the Superintendent of the National Zoological Park for the Fiscal Year ending June 30, 1920.

Burnett, W. L., and **Maxon, Asa C.** Feeding Habits and Food of the Ring-necked Pheasant. (Circular 31, Colo. Agr. College.)

Sherman, Althea R. Bird Conservation. (Iowa Conservation, July–September, 1920.)

Witherby, H. F. A Practical Handbook of British Birds. Part X.

Bulletin of the American Game Protective Association. X, No. 1, January, 1921.

Bulletin of the Charleston Museum. XVI, Nos. 6–7, 8; XVII, Nos. 1–2, October, 1920–February, 1921.

California Fish and Game. VII, No. 1, January, 1921.

Canadian Naturalist, The. XXXIV, No. 8, November, 1920.

Fins, Feathers and Fur. No. 24, December, 1920.

Le Gerfaut. X, No. 4, 1920.

Natural History. XX, Nos. 4 and 5, September–October, and November–December, 1920.

Oologist, The. XXXVIII, No. 3, March, 1921.

Science. LIII, Nos. 1358–1369, January 7 to March 25, 1921.

West Chester (Pa.) Bird Club Bulletin. 1919–1920.

CORRESPONDENCE.

A Letter of J. P. Giraud, Jr.

EDITOR OF 'THE AUK':

I am sending you a copy of a letter which I know you will find of much interest. In 1867, Mr. J. P. Giraud, Jr., presented his collection of North American birds to Vassar College, Poughkeepsie. The letter is written to my father-in-law, a Trustee of the College at that time. I include also a copy of a letter from Mathew Vassar, founder of the college, to Mr. Lossing in which Mr. Vassar recounts his first meeting with Giraud. This letter was not dated. The bracketed words did not appear in the original but seem necessary for proper construction.

Yours very sincerely,

FRANK EDGAR JOHNSON.

16 Amackassin Terrace, Yonkers, N. Y.

Poughkeepsie, April 22, 1867

Benson J. Lossing, Esqr.

DEAR SIR:

Your pleasant note of yesterday came to hand late in the afternoon.

Local associations with collection are chiefly named in the "Birds of Long Island" printed if rightly remembering 1834 [1844] a copy of which will go with the Birds, if to be obtained. There doubtless [I] have spoken of my then fondness for gunning, especially Bay shooting. Yet fond as [I] then was of that amusement still [I] desired to know something more than merely name of that shot.

Hence [I] commenced forming [a] cabinet beginning with the Large Yellow Shank Snipe, Great Bittern and Herring Gull, and of the pleasant hours of my life none have passed more pleasantly than when collecting and studying those collected, and none have been more instructive.

None but those who have thoroughly studied Natural History are aware of its far-reaching embrace, learning, as it were, by absorption in directions of which the student is not directly in pursuit.

Students of Natural History must necessarily be close observers, which may be serviceable when apart from [the] cabinet. It is very generally regarded—so believing—that by naturalists, at least, acquaintance with any branch of Natural Science is an intellectual accomplishment, quite equal to music, drawing and other accomplishments [which] much pains are taken to acquire.

Naturalists by some are apt to be regarded sceptical on the subject of revealed religion, and [I] am happy to say that none such has ever been known personally to myself, and when enthusiasts would reach beyond

the province of Natural History they are frowned upon by the true adherents of Natural Science.

The collection by friends as well as by self is regarded valuable for containing a number of rare species from which Mr. Audubon made drawings for his large copper-plate edition "Birds of America" published as you are aware some years ago in London. Among the number of rare birds from Mr. Audubon is embraced the Great Auk, which is regarded by high authority, extinct. It also contains,—which may be interesting to some,—the first European Green-winged Teal and the first European Widgeon to which attention was called as having been shot in North America.

It further embraces also the original specimens of species new to Fauna of North America, which were described and figured in [a] folio, copy of which is to accompany the birds—only fifty copies of which were printed and distributed among the prominent Institutions in the United States and Europe devoted to Natural History, and a few leading Ornithologists.

Fifteen to twenty years ago it was—so believing—the most complete collection of North American birds extant since which period intercourse with the western side of the continent has been by collectors so frequent that many new species have been discovered scarcely sustaining Mr. Audubon* in his view with expression when completing Library edition of "The Birds of North America," which expression was, "I will give one hundred dollars for each and every new bird to be found in North America—it may have been United States—during my life."

Many of those since procured we have and are now in course of being mounted by Mr. J. G. Bell, the far-famed Taxidermist who mounted all in Vassar College Cabinet of North American birds.

With species now having and for species wanting—which Mr. Bell must have many through whom (I) hope that by Christmas next "Vassar College Cabinet of North American Birds" will be equal to any collection of North American birds in the world.

Yours Very Respectfully,

J. P. Giraud, Jr.

* Prince delineator of Natural History.

Wednesday Morning

My Dear Mr. Lossing:

Yesterday for the first time in my life I had the pleasure of being made acquainted with our Fellow Citizen, J. P. Giraud, Jr., the ornithologist and generous donor of a valuable collection of Birds to "Vassar College," and I must say I was highly gratified with my friend, he was sociable, intelligent, and communicative

Yours truly,

M. Vassar

NOTES AND NEWS.

THE next annual meeting of the American Ornithologists' Union will convene in Philadelphia, the week of November 14, 1921. It is important that all members should make a note of the date at once so that preparations may be made to be present. If the matter is ignored until after the summer vacation the time is all too short and many find themselves unable to make arrangements for the trip.

There are hundreds of members who have never attended a meeting and who therefore do not know what they have missed. Why not make this meeting a memorable one in point of attendance? An A. O. U. meeting is always an inspiration and the greater the attendance the greater is the mutual benefit.

An innovation planned for this year is to have the program issued in advance, but this, while of the greatest benefit to all, can only be accomplished by prompt action on the part of those who have communications to make. Many already have papers in view and they will facilitate the arrangements if they will inform the Secretary, Dr. T. S. Palmer, 1939 Biltmore Street, Washington, D. C., of the titles of their papers and the length of time necessary for delivery, at the earliest possible moment. No paper should require more than forty-five minutes for delivery and as much less as possible; furthermore an actual test should be made so that the speaker may be sure to finish within the allotted time.

The committee of arrangements appointed by the President consists of George Spencer Morris, William L. Baily, and George H. Stuart, 3rd, together with the Secretary and President of the A. O. U. ex-officio. An additional local committee representing the Ornithological Section of the Academy of Natural Sciences of Philadelphia and the Delaware Valley Ornithological Club has also been appointed to coöperate with the above, including: J. Fletcher Street, Dr. Spencer Trotter, James A. G. Rehn, Dr. William E. Hughes, Wharton Huber, and Samuel Scoville, Jr. Further details of the arrangements will appear in later issues of 'The Auk'; the thing to do now is to make arrangements to be present in November.

STEWARDSON BROWN, an Associate of the American Ornithologists' Union since 1895, died at his residence in Germantown, Philadelphia, on March 14, 1921, in the fifty-fourth year of his age. Mr. Brown, who was unmarried, was born in Germantown on April 29, 1867, the son of the late Amos P. Brown and Frances Brown, and one of a family of nine. One of his brothers was the late Amos P. Brown, Jr., well known as a geologist and mineralogist, who held the chair of Geology in the University of Pennsylvania.

Stewardson Brown was educated in the Germantown Academy and was employed for some years in the offices of the Lehigh Valley Railroad.

His main interest had, however, always been in natural history, and in 1891 he joined the Academy of Natural Sciences of Philadelphia, where he at once became active in the botanical department, and in 1900 accepted an assistant curatorship, in charge of the herbarium, which he retained until the time of his death. He was largely responsible for the organization of the Philadelphia Botanical Club, which he served for many years as Secretary, and later as President, being also editor of the Club's journal, "Bartonia." He was lecturer on botany on the staff of the Ludwick Institute and was Professor of Botany in the Pennsylvania Horticultural Society, member of the Torrey Botanical Club, the Botanical Society of America, and the American Association for the Advancement of Science. He was author of 'The Alpine Flora of the Canadian Rockies' and (in association with Ida A. Kellar) of 'A Handbook of the Flora of Philadelphia and Vicinity,' as well as of several minor publications. Mr. Brown's interest in ornithology was only second to that in botany. From 1883 to 1889 he was closely associated with the writer in keeping a record of the migration of birds at Germantown for the U. S. Department of Agriculture and in making a local collection of bird skins. He joined the Delaware Valley Ornithological Club in 1891 and was prominent in all of its activities, serving as Treasurer, Vice President and President. Mr. Brown carried on an extended study of the flora of the Middle States and also made trips in the interests of the Academy's herbarium to British Columbia, the Florida Keys, Bermuda, Jamaica, Porto Rico and Venezuela. While these expeditions were mainly devoted to botany he never failed to bring back much valuable ornithological data as well. He was always deeply interested in horticulture and during the last years of his life, when impaired health made field work impossible, he derived great pleasure from this pursuit and in the study of the birds which came to his garden.

Mr. Brown was associated with many activities in Germantown, where his entire life had been spent, and was a vestryman of St. Luke's Episcopal Church. He was of an exceptionally cheerful and generous disposition and made close friends of all who came in contact with him.—WITMER STONE.

JOHN BURROUGHS died on March 29, near Kingsville, Ohio, on the train on which he was returning home from California, where he had been ill for the past six weeks. While not a technical ornithologist and at no time, we believe, a member of the American Ornithologists' Union, Mr. Burroughs held a prominent place in the development of American ornithology. His field was rather the interpretation of nature and his name is naturally associated with those of Thoreau and Bradford Torrey. Mr. Burroughs combined remarkable powers of observation with absolute accuracy and his writings possessed a charm that required no exaggeration or spectacular effort to heighten their power. It would be

impossible to estimate the number of persons who have been drawn, through his works, to an appreciation of nature and to enter the field of ornithology which would otherwise have remained closed to them.

John Burroughs was born at Roxbury, New York, close to the Catskill Mountains, on April 3, 1837, where he developed his love for nature, but showed no early evidence of the literary ability. In 1863 he went to Washington, D. C., and for some years filled a clerical position in the Treasury Department of the Government. It was at this time that he wrote his first book, 'Wake Robin.'

Later, in 1878, he established himself in a rural home on the Hudson River, just above Poughkeepsie, where most of his life was spent—either in the house itself or the little cabin "Slabsides," which he constructed in the woods not far away, where many of his admirers have visited him. Mr. Burroughs was a friend of Walt Whitman, Theodore Roosevelt, and John Muir, and with the last he collaborated in 'A Study of Our National Parks.'

Some of his other more important writings are 'Winter Sunshine,' 'Locusts and Wild Honey,' 'Fresh Fields,' 'Indoor Studies,' 'Birds and Poets,' 'Signs and Seasons,' 'The Light of Day,' 'Literary Values,' and 'Ways of Nature.'—W. S.

Dr. Robert Cushman Murphy, formerly of the Brooklyn Museum, has been appointed Associate Curator of Marine Birds in the American Museum of Natural History, and will devote himself to a study of the rich collections of Neotropical and Subantarctic water birds which the Museum possesses.

Mr. Wharton Huber, who spent the greater part of last year collecting in New Mexico in the interests of the Museum of Comparative Zoology, has been appointed Assistant Curator of Birds in the Museum of the Academy of Natural Sciences of Philadelphia.

Mr. Alfred M. Bailey, formerly of the Museum at New Orleans, and later connected with the U. S. Biological Survey, has been appointed Curator of Birds at the Denver Museum and is about to leave for a trip to Alaska in the interests of the Museum.

Paul Kollibay, a well known Ornithologist of Neisse, Germany, died in November, 1919. He had a notable collection of birds and made extensive exchanges with museums and collectors in all parts of the world.

Complete Sets of 'The Auk.'—Since the publication of the list of complete sets of 'The Auk' in the number for April, 1920, pp. 348–352, several sets have been transferred, a few have been completed, and others have been reported. As a result of these changes the number of complete sets now known has been increased from 154 to 175. Only nine of the additions are in public libraries and the number of those in the West and

South has been increased by three in California, and one each in South Carolina, Florida and Oklahoma, while Canada has gained two. The volumes missing in the sets in the libraries of Adelbert College, Cleveland and Columbia University, New York, have been supplied and these sets are now complete. Four transfers have been reported, including the Brewster set now in the library of the Charleston Museum, the Henshaw set transferred from Washington, D. C., to Norman, Okla., where it is now in the library of Mrs. M. M. Nice; the Osgood set now in the possession of H. B. Conover, Chicago; and the H. H. Bailey set erroneously credited to the Public Library at Newport News, Va., which has been moved to Miami, Fla. During the past year two owners of sets, Walter Faxon and John H. Flanagan, have died.

The additions to the list are as follows:

CALIFORNIA
- Emerson, W. O., Haywards (one volume incomplete)
- Hoffman, Ralph, Carpinteria.
- Ingersoll, A. M., San Diego.

DISTRICT OF COLUMBIA
- Smith, H. M., Washington.

ILLINOIS
- Field Museum, Chicago.
- University of Chicago.

MARYLAND
- Jackson, R. W., Cambridge.

MASSACHUSETTS
- Mass. Audubon Society, Boston.
- Estate of Walter Faxon, Lexington.
- Kennard, F. H., Newton Centre.
- Townsend, C. W., Boston.

MICHIGAN
- Grand Rapids Public Library.
- Barrows, W. B., East Lansing.

NEW YORK
- Crosby, M. S., Rhinebeck.
- Woodruff, Lewis B., New York.

CANADA
- University of Manitoba, Winnipeg.
- De Lury, R E. Ottawa (one volume incomplete).

ENGLAND
- Zoological Museum, Tring.

FRANCE
- Museum d'Histoire Naturelle, Paris.

SCOTLAND
- Royal Scottish Museum, Edinburgh.

SWEDEN
- Royal Swedish Academy of Science, Stockholm.

As might naturally be expected the sets are distributed very unevenly. The District of Columbia has 24, Massachusetts 23, New York 22, Cali-

fornia 16, Illinois 11, 21 other states have less than 10 each, the Philippine Islands 1, Canada 11, Great Britain 6, and France and Sweden 1 each—total 175.

T. S. PALMER

Washington, D. C.

A MANUAL OF THE BIRDS OF AUSTRALIA.—Messrs. H. F. & G. Witherby will publish immediately Volume I of the above work edited by Gregory M. Mathews, (Author of "The Birds of Australia") and Tom Iredale. It will be very fully illustrated with coloured and monochrome plates. It is expected to form four volumes of about 300 pages each. Price £3. 3s. per volume.

IN the last report of Mr. Samuel Henshaw, director of the Museum of Comparative Zoology, he states that on July 31, 1920, the collection of birds contained representatives of 2204 of the 2647 genera of recent birds listed in Sharpe's 'Handlist,' and we are informed that the number has been considerably increased since then.